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FAULTS NOT COVERED UP

The annual report of the city health commissioner of Peoria, Illinois, is a refreshing bit of frankness amidst a sea of reports that obviously attempt to make much of little under the guise of "putting one's best foot forward," but in reality is an attempt to "get by" unnoticed, or rather without revealing faults, in the fatuous hope that the faults will somehow, some way, some time, correct themselves.

In his annual report for 1935, the Peoria health commissioner said:

"In reviewing the activities of the Department of Health for the year 1935, it therefore becomes my duty to call attention to the fact that in all phases of health administration, the department is either inadequately functioning or is failing to function. The Department of Health has not expanded in proportion to the growth of the city, nor has it progressed in keeping with advance in methods of public health administration. It is therefore unable to carry on its present functions adequately, and it is leaving untouched other functions necessary for the protection of health and life."

Some months ago, this magazine called attention to seizures of market cream by inspectors for the Federal Food and Drug Administration and the finding by the courts that the cream seized was "filthy, moldy, putrid, decomposed and unfit for human consumption." It was pointed out that wherever the inspectors looked they found this loathsome food product on the market and that many of the leading creameries in the country were involved.

Some attention was given to the unsavory butter in the channels of trade and the belief expressed that if butter fit to eat were universally supplied, the consumption of this article would be increased enormously. The advantages that would accrue to the creameries, to the distributors of butter, to the dairyman and to the general public, which at present consumes only one-half the table spread fat required for its proper nutrition, were discussed.

One result of the discussion was a set of resolutions from a district veterinary association in a leading dairy state deploring the publicizing of the unwholesome condition of market cream, and expressing the opinion that such information getting to the general public would result in less use of butter and thereby injure the dairy industry. In effect, these resolutions oppose disclosing an unwholesome condition.

It requires only one guess as to which will be improved the sooner, the health department of Peoria, or the quality of market cream—and as to which will attain the greater public confidence, the health department of Peoria or the veterinary profession in the said dairy state.

FALLACIES OF COUNSELS OF PERFECTION

Veterinarians never tire of pointing to the achievements of the medical profession in preventive medicine and usually leave the inference that with equal public support, they could make a comparable showing in preventive veterinary medicine. Perhaps so; the success in controlling bovine tuberculosis, glanders and certain exotic epizootics, when public support was liberally given augurs thus. But some introspection to see if we are doing the best that we may under the conditions that prevail is in order. Perhaps the approach of the medical profession to its problems is responsible for the greater public support that it gets. The medical profession possesses the information necessary for the eradication of smallpox, diphtheria, typhoid fever and other common diseases of man, perhaps even including tuberculosis, but the public will not give the support necessary for carrying out eradication measures. That doesn't prevent health departments from applying such alleviating measures as the public will support and a morbidity and mortality rate for most infectious diseases lowered from year to year attests the value of palliative measures.

The attitude of the medical profession toward vaccination as a means of controlling disease differs materially from that of the Veterinary profession. Public health departments urge vaccination wherever it has merit. Except as a means of preventing hog cholera, vaccination has received opposition, or but grudging support, from leaders of the veterinary profession. The attitude of the medical profession on the use of vaccines is illustrated by a recent issue of a bulletin of the public health department of Illinois, wherein it says: "So far this year, typhoid has been running considerably below any previous experience, due at least in part, it is believed, to the vigorous efforts of the State Department of Public Health in locating carrier sources, promoting vaccination and the sanitation of milk and water. About 70,000 people were vaccinated against typhoid last year." And again: "Typhoid vaccine enough to inoculate 20,572 people was distributed [by the State Department of Public Health] during the first seven months of 1936. This is less adequate for controlling typhoid than the amounts of diphtheria toxoid and smallpox vaccines distributed for controlling those diseases."

Of smallpox, the bulletin says: "Foci of infection have appeared in various places. These are alarm signals. Vaccination is the weapon with which to combat the disease."

Of diphtheria, the bulletin says: "A great number of cases is unlikely, because a large proportion of children have been inoculated against the disease. Local outbreaks may occur where this precaution has been neglected. . . . It may be added that inoculation is no guarantee against diphtheria, although it protects in most cases."

Other issues of the Illinois Health Department bulletin have stressed the advisability of vaccination for the prevention of other diseases—even immunizations for hay fever, which is possibly not more than 25% effective.

For years the evidence that vaccination against Bang's disease reduced the loss in calves and in milk production in infected herds has been unassailable, as has also its harmlessness in such herds; yet veterinary regulatory officials have placed every possible obstacle in the way of this valuable measure of disease control and veterinary organizations have condemned it even while a majority of their members were practicing it. One effect of this opposition to vaccination, which many dairymen demand with good reason, has been to place it quite largely in nonprofessional hands—a misfortune alike to cattle owners and veterinary practitioners.

Suggesting the use of live culture antiabortion vaccine does not in any sense imply that other measures proved effective in controlling the disease, should be discontinued or that attempts to improve the vaccine should not be pursued; notwithstanding the A. V. M. A. only four years ago rejected a committee recommendation that

efforts to improve anti-abortion vaccine be continued. There is a great number of commercial dairies where, as yet, no measures for the control of Bang's disease, other than the vaccination method gives any promise of practical usefulness. To delay the control of this costly disease in such dairies, while waiting for the perfect vaccine, or till a means of testing segregation and slaughter applicable in such dairies is discovered, is not the approach likely to win public approbation. The medical profession does the best that it can with the tools available at the time and strives for better tools meanwhile.

About 15 years ago, a new sort of vaccine for the prevention of rabies in dogs was introduced to American veterinarians. It had several faults, but at its worst was more than 50% effective. Improvements in its manufacture and use have since made it one of the most efficient of biological products of either human or veterinary medicine; but it has not, even yet, attained anything like universal approval as a means of the control of rabies. In the recent outbreak of rabies in Chicago, in the face of determined opposition to the quarantine measures adopted, the city health department only mildly, almost apologetically suggested vaccination, and while vaccinated dogs were permitted to move freely into and out of the quarantined area, it was thought inadvisable to make any public announcement of this permission. A prominent veterinarian stated publicly that vaccination against rabies should not be made compulsory because "it is only 90% efficient." The statement is wide of the mark on two counts: (1) Anti-rabies vaccination is at present more than 90% effective in preventing the disease in exposed dogs and (2) if it were only 50% effective, it would still be well worth while. This statement opposing compulsory vaccination was made in support of quarantine, which at that time was certainly not more than 25% effective in Chicago. Everyone recognizes the value of quarantine against rabies and at the same time realizes, that in practical application to any considerable area, it is almost never more than 75% effective. To demand that vaccination must be 100% effective before acceptance is highly illogical.

Of 40 deaths of persons from rabies in Illinois in the last 10 years (11 in 1936) 18 had received the Pasteur treatment. Yet no one suggests abandoning it because it is not "100% efficient."

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It has never been the desire or the policy of the [U. S.] Public Health Service to invade the field of the private medical practitioner.—Edit. in *The Military Surgeon.*

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Research at the Wisconsin station indicated that when cows cease to react to the agglutination test for Bang's disease, there is little or no danger in admitting them to the healthy herd.

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The results of an experiment at the Wisconsin station indicates that a light infestation of internal parasites in poultry is of little or no consequence as far as egg production and hatchability of the eggs are concerned.

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The veterinary profession offers neither ease nor affluence; rather it exacts that he who qualifies shall consecrate himself to the utilitarian and humanitarian tasks of promoting the welfare of animal and human life, by rendering sympathetic competent service.

* * * *

The conclusion was reached at the Wisconsin station that dairy cows should be bred 30 to 60 days after calving. Cows that freshen every 10 to 11 months were most profitable. The daily average production of butterfat was found to decrease with lengthening the period between calvings. However, no account seems to have been taken of the cost of replacing the cow which must be required earlier, under such a breeding system, than normally, nor of the loss of calves from weakness and infection, nor the cost of dystocia which would undoubtedly be increased in frequency. Only butter fat production was considered.

POULTRY-PLAN EMBLEM AVAILABLE TO COOPERATORS

A new feature of the National Poultry Improvement Plan is an emblem for use by cooperating breeders and hatchery operators.

Participants in the National Plan during the first year, beginning July 1, 1935, included 1,017 breeders, and commercial hatcheries with a total hatching capacity of more than 38,000,000 eggs. There were 190 U. S. record-of-performance flocks with 67,000 birds being trapnested. A total of 34 states were engaged in one or more phases of the work. During the present year five additional states have adopted the plan.

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MODIFIED U. S. REGULATION ON DOG AND CAT FOOD IN EFFECT

Recent developments in the commercial preparation of dog food, cat food, and similar products have caused the Bureau of Animal Industry, U. S. Department of Agriculture, to modify its regulations pertaining to these products. The new requirements provide for the withdrawal of the familiar meat-inspection stamp from containers of dog food and similar products. It provides, however, that containers of such products may bear the statement "The meat or meat byproduct ingredient of this article has been examined and passed under Federal supervision. This article has been prepared in an establishment operating under Federal meat inspection."

The regulation, now in effect, also provides that the regular meat-inspection legend as used on food intended for human consumption may not be used on foods designated as being intended for dogs, cats, foxes, and similar animals. Thus the inspection legend "U. S. Inspected and Passed by the Department of Agriculture" is reserved exclusively for foods intended for human consumption.

The essential purpose of the new amendment is to inform the public that the meat ingredient has been inspected and passed but that inspection has not included various other ingredients with which the meat has been combined.

The amendment further provides that when dog food or like articles are prepared in a part of a federally inspected establishment, its sanitation shall receive the same supervision as other parts of the establishment.

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THE INCIDENCE OF DISEASE AMONG FARM ANIMALS

Quoting H. R. Smith, livestock commissioner of Chicago, the *Poultry Tribune* of September, 1936, states that approximately 54% of the poultry flocks of the North Central States from Michigan and Ohio east to the Dakotas west and north are infected to a greater or less degree with avian tuberculosis, although only one-sixth of the flocks tuberculin tested showed clinical evidence of the disease. A plan of control is recommended.

Gradually it is dawning upon the stock-owning public that the incidence of wealth-sapping disease among their animals runs high wherever a systematic survey is made. Although Salmon, Law, Winchester, Peters and others told about the high incidence of bovine tuberculosis in the milk sheds of the large cities in the 1890's, more than 40 years elapsed before the disease was brought under control. In 1869, Dr. Geo. H. Dadd (*Vet. Med. Sept.*, 1936) and many after him warned against the spread of abortion among cows but it was only in 1935, after a lapse of 66 years, that an emergency measure exposed the true figures on the percentage of infected animals and herds. The eradication of Texas fever was made possible in 1893 but the discovery was tardy in getting attention and the control work remains incomplete after 43 years. A half-century has passed since Pasteur showed the way to control rabies but in 1936 rabies is still threatening the popularity of dogs and the number of victims of rabid dog bites has not been reduced. Well, wrangle your own conclusion; but don't go on believing that withholding the facts will ever improve matters. That course has been tried, thoroughly.

OUR ANIMAL PRODIGIES

There are record-breaking prodigies among our domestic animals. Except for dogs we have the "best in the world" performers of this and that species. We have cows that give the most milk and the most butterfat per annum, trotters and pacers that clip off a mile in just about no time, hens that lay a lot of eggs, and ever so many ton litters of six-month-old pigs. But on the average the performance of American livestock falls far short of making a decent showing in anything. As Professor Perry of New Jersey College of Agriculture said the other day of our dairy cows, "One-half of our present cow population would suffice for our current supply of dairy products." That is to say, we feed 24,000,000 cows to produce what 12,000,000 cows should and the farmers pay the extra feed bill. A crowd of 10,000 gathered in Northern Illinois in June to watch a draft team pull upon a dynamoneter the equivalent of a 41,500-pound wagon, but it is indeed a question if the average Illinois team of farm horses could pull the hat off —well look at the number of tractors on midget farms. In short, after all of the tremendous effort and expense devoted to feeds and feeding, breeds and breeding, genetics, or what have you, American animal husbandry is still more or less a gigantic failure. Its averages are too low; its records of isolated performances extremely deceptive. Figures of high records have fooled folks and as a consequence the farmers go merrily on believing their animal husbandry a model. By raising livestock to conserve nitrogen and bring in some extra change, the American farmer by hard work manages to "get by" after a fashion, but we know of few who enriched themselves raising the mill-run of livestock.

The truth appears to be that animal husbandry which occupies so much attention and sets itself far above veterinary medicine, is much like the latter in discipline. If true figures on the losses the American farmer suffers from diseases were set alongside of those incurred from the feeding and breeding of "boarders" the cause of agricultural depression would be laid on the table for intelligent consideration. Agricultural science including zootechnics, like veterinary science has made great progress but the general application in both cases is not a credit to an intelligent people.

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TUBERCULIN TEST REGULATION INVALID

The South Dakota Supreme Court recently held invalid a compulsory tuberculin test regulation of the state secretary of agriculture. The court held the regulation invalid on two counts:

1. The laws of South Dakota merely confer upon the secretary of agriculture the power and right to make investigations and quarantine and control in event of the established existence of communicable disease as a fact.

2. The legislature has not delegated the compulsory power to the secretary of agriculture and that if there has been an attempt to delegate such power it would have failed as an improper delegation.

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PASTEURIZATION IS MILK INSURANCE

Milk pasteurization is simply a matter of insurance. A family might drink raw milk for twenty-five or more years with perfect impunity so far as the risk of communicable disease is concerned. On the other hand, some inadvertent circumstance might lead to the contamination of milk and the illness of the family at any time. Three outbreaks of typhoid fever in Illinois last year and two of scarlet fever during 1936, all traced to raw milk, are evidence enough of the reality of the risks involved.

The State Director of Public Health believes that the consumption of milk in Illinois could be doubled to the great health advantage of the people. His scientific training and his observation of what has taken place forbids him, however, of recommending the use of milk that fails to meet the highest sanitary requirements. For practical purposes this means pasteurization.—*Illinois Health Messenger.*

MILK PASTEURIZATION INCREASES MILK CONSUMPTION

Unpasteurized milk was responsible for two rather serious outbreaks of scarlet fever in Illinois during 1936. One at Moline in February and another at Kewanee in March and April. In each instance a case of scarlet fever on a dairy farm was the source of the infection. At Moline, more than 80 cases occurred among the customers of one dealer in raw milk. At Kewanee a smaller number of cases occurred all among the users of milk from a single dairy. Kewanee experienced a milk-borne outbreak of typhoid fever some years ago, in which there were 25 cases and several deaths. It, too, resulted from unpasteurized milk.

It is not difficult to visualize the effect these two milk-born epidemics in Kewanee must have had in reducing milk consumption in that city, or the enlarged market for dairymen about Kewanee that awaits pasteurization and re-established public confidence in the safety of mik as a food.

PHOSPHORUS DEFICIENCY

As pointed out by Theiler and Green in South Africa and Australia, phosphorus deficiency is a wide-spread affection of domestic animals. It strikes cattle and sheep more than horses, although important in preventing growth in colts. Heifers are particularly predisposed to the effect on gestation and lactation and calves begin to show the effect as soon as they are weaned. Milk appears to furnish sufficient phosphorus for their early needs.

It was in the study of enzootic botulism of cattle that the deficiency of phosphorus was brought to light. Pasturing on phosphorus-deficient land pressed cattle to search for and eat bones and putrefied carcass *debris* which infected them with botulism. The hunger for phosphorus was the indirect cause of the botulinus infection. It will be recalled that these authors pointed out that the phosphorus deficiency occurred in variable degrees. Slight cases hunted for clean white bones while severe one ate anything, from stinking detritus to poisonous plants.

The osteophagia-botulism syndrome of South African cattle is worthy of considerable study among animals affected with a pica of mineral-deficiency origin that causes them to eat animal or vegetable material they would otherwise avoid. Perhaps some of our poisonous plant troubles have not only a shortage of suitable forage, but an existing deficiency, as the primary cause. Perhaps in not a few cases a nutritional deficiency is the sole cause for eating poisonous plants.

THE HOTIS TEST FOR MASTITIS

A new test which promises to be a useful means of detecting mastitis, a troublesome and costly disease of dairy cattle, has been developed by research workers in the U. S. Department of Agriculture. The new method is known as the "Hotis test," named after its originator R. P. Hotis, of the Bureau of Dairy Industry, who died soon after conducting most of the experimental work.

Although the method has been applied only on a limited basis thus far, Department officials plan to give it practical field tests to determine its adaptability under various conditions, for the diagnosis of mastitis in dairy herds.

Briefly the test consists in adding 0.5cc of a sterile 0.5% aqueous solution of bromcresol-purple (dibromorthocresolsulphonphthalein) to 9.5cc of milk previously measured into a sterile test tube. The tube is inverted several times to mix the contents and is then incubated for 24 hours at 37.5° C. When the dye and milk are first mixed, the mixture is a purple color. If streptococci are present, the color changes during the incubation period from purple to a greenish or yellow shade as the result of acid production from the lactose. Furthermore, if *Streptococcus agalactiae* is present, small flakes or balls of growth, from 0.5 to 4mm in diameter, usually form on the side of the tube. These growths are usually canary-yellow and are quite distinctive. In a series of 753 samples the reactions by this test were in agreement with the blood-agar method in 94.6% of the samples.

Anaphylaxis, Tuberculosis and the Vegetative Nervous System

THE sensitivity to anaphylaxis[1] or more properly speaking, the seriousness of anaphylactic accidents, varies enormously in the different species of animals as do also comparable protective agencies. The guinea pig, for example, is very responsive to both sensitizing and desensitizing influences. On the contrary, the rat is quite refractory. Between these two extremes are classed the rabbit, the dog, the cow, the horse, man, etc.

The gravity of tuberculosis in the different animal species presents comparable variations. The guinea pig is extraordinarily sensitive. It requires but minute doses of the bacillus to infect and the result is lethal, while the rat will support inoculations of Koch's bacillus and carry the organisms in its blood without inconvenience. Again, between these two extremes lie the other animals. Individual variations exist to some extent. In man, the tuberculous organism is common but in the living body it forms but discreet lesions, generally glandular, which only exceptionally produce illness. Already 40 years ago, the numerous tuberculous cicatrices found in autopsies were signalized by Brouardel. Non-evolutional lesions containing live bacilli, virulent for guinea pigs, are the rule. Only one person out of 200 carrying the bacillus is ill from the invasion. One must, therefore, conclude that Koch's bacillus is only exceptionally harmful to man. It is customary to broach the subject as a question of terrain, the easy but vague explanation. Other explanations are in order.

It is agreed that the harmfulness of pathogenic microbes lies in the toxins secreted by the living specimen. In the case of tuberculosis there is the well known fact that the injection of killed bacilli into the tuberculous subject aggravates the trouble considerably, provoking a general and local reaction characterized by congestion of the existing lesions. The phenomena are comparable to those observed in the accentuating case of tuberculosis. One has, therefore, the right to contend that the noxious agent in tuberculosis comes from the disintegration of dead bacilli. In fact one can conclude that the tuberculous poisons are contained in the degredation products of bacillary cadavers.

IF judged by what they do, anaphylactic microbian poisons are poisons to the vegetative apparatus. It is known that the sympathetic and parasympathetic nervous systems do not react like the voluntary system in transmitting excitation to the reacting organ but by secreting hormones at the level of the intertissue nerve terminals which function as veritable glands of internal secretion—hormones capable of producing nerve excitation by direct action on the cells of the reacting organ.

Anaphylactic or microbian poisons causing functional derangement, such as vasodilatation, hemorrhagic diarrhea, hyper or hypotension, dyspnea, disturbed heat regulation, etc., are excitations or paralyses of the vegetative nervous system of the same genre as if produced by such hormones as sympathine, epinephrin and acetylcholine.

LEAVING the above mentioned idea, the author explored the sensitivity of the cardiac parasympathetic mechanism of different species of mammiferous animals to the action of pilocarpine and atropine. By exciting the vagus, pilocarpine slows up the heart while atropine has the opposite action. It accelerates the heart by suppressing the tonus of the entire parasympathetic system. These tests were made on rabbits, cows, dogs, horses, rats, guinea pigs, and monkeys. This research which lasted a year gave remarkable results:

[1] Maignon, F. Anaphylaxie, tuberculose and système nerveux végétatif. Abst. from *Bulletin de l'Académie Vétérinaire de France.*

Pilocarpine slowed the heart of guinea pigs, 63%; of rabbits, 42%; of dogs, 43%; of rats, 24% but, strangely, it accelerated the heart of horses, 16%; of cows, 3%; of monkeys from 0% to 35% according to species.

The variability in the action of atropine in accelerating the heart's action was striking: In the guinea pig the acceleration was 39%; in the rabbit, 31%; in the dog, 113%; in the cow, 19%; in the horse, 138%; monkeys from 0% to 18% in four different species.

These figures are minutely analyzed in their relation to sensitivity which, obviously, is extremely varied. Sensitizing agents are blocked by high tonus and *vice versa* in the different animals investigated. The presumption that the sensitivity runs parallel for each species was verified by determining the lethal dose, which was found to oscillate with the percentages shown above.

FROM these results, mammalia can be classified according to their sensitivity to anaphylaxis and tuberculosis. At one extremity is the guinea pig, highly sensitive to the cardiac depression and mortality from pilocarpine and epinephrin, and equally sensitive to anaphylaxis and tuberculosis. On the other extremity is the rat, horse, and cow, each of which is discussed to put them in harmony with the hypothesis. The rat may be considered as refractory to anaphylaxis and tuberculosis; the horse is anaphylactic and contracts tuberculosis occasionally; and the cow is frequently infected because of her aptitude for cultivation of the infecting organism, not because of her sensitivity to the bacillary poison.

Man, from the tuberculosis point of view, has individual aptitudes. In general, human tuberculosis is very infective. In cities nearly everyone is "tuberculized," but only one in 200 becomes sick from the disease. In microbian diseases, one must distinguish sharply between *receptivity* which is the faculty to cultivate the microbe in the humors or tissues and the pathogenic factor. More often *pathogenicity* is *toxicity* or the sensitivity of the body to microbian poisons. But it might also be occasioned by disorders due to considerable extension of lesions which produce grave mechanical or functional interference. One distinguished *death by toxicity* from *death by extension of lesions*. In man, both of these forms exist. There are grave cases (toxic form) with minimum lesions and conversely, extensive lesions coexisting with excellent health. The latter form is the common one in the bovine species while in the guinea pig, the infection progresses rapidly to emaciation in the toxic form.

Further evidence of the influence of the vegetative nervous system on tuberculosis are the "days of hemoptysis" in sanitaria for consumptives. On certain days, the percentage of "bleeders" runs high. Meterologists attribute these exercebations to the effect on the vegetative nervous system of electric conditions of the air (ionization), which is regarded as a factor in selecting places for the treatment of consumptives. Good locations exist at sea level as well as in the high altitudes.

Comment: The experimental findings reported in the foregoing is an important addition to pharmacodynamics. Dosing according to body weight based largely upon human materia medica was the resort of a half-trained profession. The influence of the unthinking tends to its perpetuation. Veterinary medicine needs a complete posology of its own. In its development not too much progress is being made.—ED.

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BANG'S DISEASE PROJECT GROWS

According to a report of the U. S. Department of Agriculture there were, on November 1, 1936, nearly six and one-half million breeding cattle under supervision in the cooperative Bang's disease project, representing 14.4% of the breeding cattle in the United States. The percentage of breeding cattle under supervision in the various states varied from 0.1% in California to 58% in Virginia. Wisconsin led in the number of cattle under supervision with 689,604 (27.3%); Minnesota was second with 619,200 (27.9%), and Oklahoma was third with 508,238 (32.8%).

Vitamins and Distemper

I. Introduction

By W. O. FROHRING,
Cleveland, Ohio

A FEW years ago, I was discussing the subject of distemper with a former associate. He made the statement that while considerable progress had been made in the science of veterinary medicine since he was graduated from veterinary college, so far as he could see, the problem of distemper at the present time is not solved any more than when he left school. I was surprised to have him say this, as I had been under the impression that the Duncan-Laidlaw method of immunizing had furnished a complete and satisfactory solution to the problem. He then called my attention to the fact that in spite of immunization of seemingly healthy puppies, a condition which appeared to be distemper, somtimes developed in these animals. To have a healthy puppy become sick and die after receiving the immunizing treatment had had such an ill effect on his practice that he had discontinued using the method.

Since the most common form of distemper is the respiratory type, and since rats depleted of vitamin A had been shown to have a lowered resistance to respiratory infections, it occurred to me that studies in connection with the relationship of vitamin A to the respiratory type of distemper might be of interest. My friend greeted this suggestion with enthusiasm and promised to furnish me with puppies of known history that had not had distemper.

WHEN I began to investigate the subject further I found that almost all of the experimental work that had been done on distemper had followed the bacteriologist's usual method of choice. This consists of an attempt to isolate the suspected offending organism or virus and then to prove it the causative agent of the disease by reproducing the symptoms through injection of live organisms or viruses into the animal. Then, having found the organisms or viruses that would cause the disease, the investigator next attempts to immunize the animals by means of vaccines or serums, possibly in combination with small doses of live virus.

These methods are, without question, extremely useful and in many diseases have offered a complete solution to the problem. However, it is evident that while good results have been obtained by many workers with the Duncan-Laidlaw method of immunization in distemper, this has not been by any means a universal experience, and, in the practice of veterinary medicine, distemper still looms as a major problem and difficulty.

ACCORDING to Dalling[1] who has had an important part in the development of the method of immunizing for distemper, the chief criticisms of the method are (1) illness following immediately after the injection of the vaccine or virus, (2) nervous disturbances following the use of the prophylactics immediately or months later, and (3) a breakdown in immunity a considerable time after the use of the prophylactics. He attributes these failures principally to (1) inferior quality of the vaccine or virus, (2) the condition of the dog at the time of inoculation (that is, the dog may already have been exposed to distemper and may have the disease in an incubative stage at the time of injection), (3) the age of the dogs, and (4) wrong diagnosis.

These types of failure and their possible explanation by a protagonist of the immunization method bring out several points that make it clear that the control of distemper may be more than a mere bacteriological problem.

SINCE practically all the recorded work on distemper had been done from the standpoint of proving that the disease is produced by the *presence* of a contaminating factor,—in this instance the virus—I

decided to approach the problem from the opposite viewpoint of determining the effect of the *absence* of a protective factor, —in this case the vitamins. This does not mean that I reject as useless the work on the bacteriology of the disease, nor that I deny the presence of possible bacteriologic factors, but I wanted to see how far one could go toward a solution of the problem from the nutritional standpoint alone.

Ever since the discovery of the accessory food factors, the time and energy of many investigators have been devoted to a study of nutritional deficiencies, and also to a search for those food factors which might promote resistance to infection.

THE necessity of vitamins in the nutrition and health of the dog was confirmed by Mellanby[2] who reported on the relation of diet to susceptibility to infection of the respiratory tract. In a special report (1926) he commented on the "readiness with which dogs succumb to distemper and the great intensity of mange when these diseases appear in animals whose diets are deficient in vitamin A." Mellanby summarized his findings as follows:

"Diets defective in quality but abundant in quantity may be responsible for the following conditions arising in animals.

"1. Heart failure during anesthesia and difficulty in recovery so that after anesthesia they refuse food and lose weight.

"'2. Several types of nervous defects including incoordinated movements, paralysis, convulsions and tetany.

"3. Keratomalacia.

"4. Increased susceptibility and lowered resistance to distemper and other catarrhal conditions; bronchopneumonia and skin infections like mange."

Many of these effects are similar, if not identical with symptoms in dogs that are attributed to distemper. If a puppy refuses food and becomes ill in any way, it is usually said to have some form of distemper. Before this study was undertaken, it occurred to me, and subsequent experimental work has confirmed this impression, that many dogs that are said to have distemper are suffering merely from some form of nutritional deficiency.

ANOTHER fact which contributed to this view is that distemper is a disease primarily of growing puppies and is not so likely to appear in older dogs. Since the literature shows that all young animals, including puppies, are born with a relatively low reserve of vitamin A and also need vitamin A for growth, the possibility that puppies may suffer from a lack of vitamin A seemed entirely probable.

THE first method of approaching the problem was to attempt to determine whether giving a puppy a diet complete in respect to all of the vitamins known to be essential to the dog, in addition to his requirements for protein, carbohydrate, fats and minerals, would tend to increase his resistance to natural exposure to dogs in a distemper ward that exhibited the various pathologic conditions now diagnosed as distemper. This method was chosen because in spontaneous distemper as it occurs as a problem of the dog owner, the disease is not produced by artificially injecting the bacteria or virus into the dog, but by exposure to other animals with the disease.

The preliminary tests involving approximately 150 puppies yielded strong indications that an adequate diet has a pronounced protective effect in increasing the animal's resistance to natural exposure to distemper. It then was decided to study the effects of various vitamin deficiencies in young growing puppies by means of the synthetic diet, and also to determine the approximate vitamin A requirements of growing puppies.

Some of the questions that presented themselves were as follows:

1. What happens to a young growing puppy when his food is complete in every other respect except vitamin A?

2. What are his minimum requirements daily of vitamin A?

3. What effect does a suboptimal intake of vitamin A produce?

4. What pathologic conditions are caused solely by the complete or partial deficiency?

5. What relationship does this have to resistance to infections?

Since these various questions should be applied also to each of the several components of the vitamin B complex and to the other vitamins and their fractions, the magnitude of the problem is apparent. In addition, combinations of latent or complete deficiencies of two or more vitamins still further complicate the problem.

A realization of the difficulty in making a complete study, even with hundreds of puppies, in a three- or four-year period, is what determined the methods used in these experiments. This report is offered as a record of work so far accomplished.

Since these experiments were begun as a hobby with no thought of publication in mind, accurate records were not kept on the first 192 animals used. The relationships between good nutrition and resistance to infection by the animals exhibiting the disease commonly referred to as distemper was illustrated, so strikingly, in these experiments that it was decided to pursue these studies further, particularly in connection with the removal of different vitamins from synthetic diets, in order to study the various vitamin deficiencies in growing puppies. The need for this became more and more apparent, for, as the experiments proceeded, many symptoms suggestive of vitamin deficiency were evident in observations on animals with distemper.

I FIND, in attempting to tell of some of the work that I have been doing in connection with nutrition and with nutrition and distemper, that veterinarians, for instance, are likely to come to the erroneous conclusion that I have decided that bacteria or viruses do not exist and that if the diet is right, a pup cannot die from any infection. This, of course, is not at all the case. What I do contend, however, which really summarizes all the work that I have done, is that if all vitamin deficiencies are eliminated in growing puppies, certainly 90% or more of the difficulties usually encountered in raising them, will be solved.

Hence I feel that the records of the following experiments have some practical value to the dog owner and the veterinarian in combating distemper, and perhaps also in elucidating the diagnosis of distemper. While my own experiments cannot be regarded as furnishing conclusive proof, they do suggest that further studies might serve to differentiate the diseases due solely to nutritional deficiency from those in which there is also an infectious element. My interest in this subject has also been enhanced by the hope that the findings in canine distemper might prove suggestive and stimulate similar researches in certain virus diseases of man.

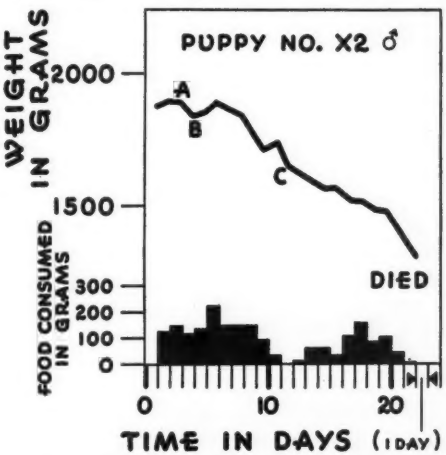

Fig. 1. This puppy received a vitamin A-free diet plus 10% yeast and also a mixture of 5 cc. of crystalline Carotene in Oil daily—4200 U. S. P. units per gram. The puppy was devocalized on the third day. The chart provides a striking illustration of Mellanby's finding that on diets "deficient in quality," animals often refuse food after anesthesia. Their weight continues to decline and they die. Puppies do not stand anesthesia very well when they are slightly deficient at the time of anesthesia. This shows the desirability of eliminating any latent deficiencies before anesthesia.

References

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Note.—This is the first of a series of articles by the same author on the subject of vitamins and distemper in dogs. The second article of this series will appear next month.—*Editor.*

Bang's Disease Testing

By E. T. BAKER, Moscow, Idaho

PERHAPS our experience in testing some 1200 herds of over 8,300 cattle to date may be of benefit to others who are just beginning the work.

In mapping out the campaign for our county we first went to the assessor's office and made a copy of the names of about 1600 cattle owners with their postoffice address, and approximate number of animals.

In the second place, we kept all publicity out of the local newspapers. This was done so that not all the owners would be clamoring to have their cattle tested at the same time.

The next important thing was to keep the results of each test strictly private. If the owner wished to tell his neighbors that was all right with us; but we weren't telling.

OUR county is very hilly and mountainous, with rugged canyons several thousand feet deep, separating various "ridges" from the others. This makes travel difficult, even dangerous in bad weather, so we had to take that into consideration. A large number of cattle owners can be reached with a car only about four months of the year (June to September), so we tried to work these during that period.

Many of our barns have only three or four stanchions for the milk cows, while the young have to be wrangled, buckaroo fashion, in a corral or shed. Our helper is an old time cowpuncher who can still flip the lariat with deadly accuracy, and thus handle the wildest "critter."

JUST last week a typical incident occurred that shows what one is up against in the field. We had left our home about five in the morning to test some cattle away up in the mountains where the owls eat with the chickens.

We had made arrangements to test four herds, comprising about forty head, that day. At the first ranch, we found five milk cows of mixed breeding, with red Durham and antelope blood predominating. Three more were unbroken heifers, and there was a young bull wilder than a Spanish revolutionist.

We bled the milk cows and two of the heifers quickly, but the third one showed her Hambletonian ancestry by rushing around the shed and knocking the owner into a pile of very soft manure. She added insult to injury by stepping all over my helper's toes. The latter, who now had a body temperature of 104°F. in the shade, ran to the car for the lariat. He quickly roped the playful creature, and with the help of the owner flopped it on its back so hard that we had it bled and ear tagged before it came to. We had to handle the bull in much the same fashion, with the owner's full and profane consent.

AT THE next place we came to, there were five wild cattle tied up to a fence, and we spent over an hour testing them. The third rancher's cattle had broken down a door on the shed and had scattered over the mountains, and the fourth had only two milk cows in the barn to test. In other words, we had worked like troopers all day in testing 16 head; but it is all in the day's work. Perhaps the next trip we would find quiet animals tied up in barns where they could be tested with very little trouble.

ANOTHER problem was to keep within the 1500-mile per month travel limit, for we have many 80 and 90 mile round trips. We solved this by arranging two short trips, two medium trips and two long trips per week, with about 350 miles per week as the maximum.

In beginning the work in our county, instead of going out and testing all the accessible herds at first, we tried to test an equal number of easy and of difficult ones. While we have never made a high record, we have taken all herds, large and small, just as they came, so that today our testing is very little different than when we began.

Equipment

Our equipment, with the exception of the halter and lariat, is carried in two small grips. Each grip weighs about ten pounds, complete. The helper takes care of the halter and the grip containing:

1. Bleeding needles and vial holder.
2. Syringe for cleansing needles.
3. Tourniquet.
4. Antiseptic.
5. Ear tags and pliers.
6. Small whetstone.
7. Extra needles; several towels.

We take care of the other grip and agreements, which are carried on a small wooden file. Our grip contains:

1. Wooden vial container, holding 48 vials.
2. Hot water bottle.
3. Extra towels.

In summer, we fill our hot water bottle with ice water, and place it in the grip; lay several towels over it, and on this place the wooden vial holder. The wooden container becomes very cold, and when the blood is drawn, it is chilled promptly and coagulates normally. We have found that much depends on the first few minutes of a blood sample's existence. If it is allowed to stay warm for some time and think over its past life, it is liable to separate and spoil.

In winter, we use a "waterless hot water pad" in our grip, which keeps the samples from freezing.

We carry our record book in our hip pocket; and an indelible pencil for signing the agreements and a common lead pencil for writing down the description of the cattle.

In our car, we carry a wash pan and some aromatic disinfectant to dip our rubber shoes in just as we get ready to leave a ranch. There is quite a lot we do not know about the transmissibility of the infection. This looks good to the owner, indicating to him that we are taking every precaution possible in our work.

Assembling the Cattle

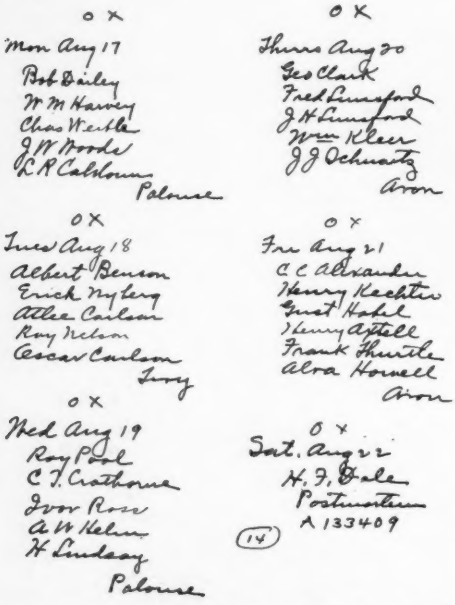
We have found early morning the best time to work, except in very cold weather. If we can arrive at a ranch just after milking time, we find the animals quiet and cool. The owner can then turn them out at their usual time, and is put to little bother. Unless a veterinarian is an early riser, he will never be very popular among cattle owners.

AUTHOR'S FAVORITE SPORT
Doctor Baker never misses a tournament within a hundred miles of his home. Bowling average, 185.

We have devised what we call our "work sheet," and which we have found invaluable. This is made out for a month, each sheet representing a week's work, beginning with Monday. The illustration shows how it is made.

About Thursday or Friday of the week before, we begin making plans for the coming week. This is done so we can get our franked post cards (A 3) in the mail Friday evening to be delivered in the country Sat-

urday morning for Monday and Tuesday's testing. The other cards are mailed so the owners will receive them about two days in advance.



Work sheet, with schedule made out for the coming week.

A circle above the date denotes that we have notified the owners, and an "X" signifies the work has been completed. At the end of the week, we turn to a new page and begin as before. In this way, we can work out a schedule that will keep us within the 1500 mile limit.

Also, we often make arrangements to test herds while out on a trip to that neighborhood. In this way we can avoid visiting ranches when the owner is away, or very busy with a special crop, such as beans, watermelons or grain.

We also make out a list of infected herds to be re-tested in two groups: First, those on good roads that can be tested at any time, and second, those on dirt roads or trails that must be attended to during good weather.

We notify all owners of reactors by letter when we will be out to tag and brand them. This insures privacy. To use a country phone would be just the same as broadcasting over a national network.

We carry our reactor tags, branding ink, iron and pliers in a small box in the car.

Experience has taught us that a good halter is the best type of restraint. The halter is made of 15 feet of rope.

We might add our new Buick (our sixth one, by the way), with the extra tire on the left fender well, gives us ample space back of the seat for our grips, halter and lariat. In this way we do not have to be "messing" around the rear deck among our medical and surgical grips.

The halter, made by our helper, is constructed from 22 feet of 5/8 manila rope. The rope from the halter to the end with a loop on it, is 15 feet. This gives ample length to snub around a solid post in the barn or in the corral. The loop end can be used as a lariat on young stuff to catch them; then the halter is slipped over their heads, and they remain where one wants them. The tighter they pull, the tighter the nose piece becomes, so a wise animal soon gives up.

Our lariat is the regular 30-foot rope generally used by stockmen everywhere.

We carry a pair of bullholders in our car, but very seldom use them, as animals seem to fight them more than anything else.

Actual Bleeding

Driving up to a ranch where we are expected, we have the owner sign the agreement, and then figure out the best plan to restrain the animals.

We next write down a description of the cattle; their number, age, sex, breed and ear tag. Also, the name of the owner, ad-

dress, direction from nearest town, date of test and mileage.

We keep a string of 25 ear tags in a box made for this purpose, with a safety pin in the upper end, so our helper will not mistake the wrong end of the tags in a dark barn. A mix-up in ear tags will cause more trouble than trying to raise a family of nine girls in a mining town.

Our helper then slips the halter on the first animal, and draws its head slightly to the left, snubbing the rope around a solid post. We then apply our tourniquet, swab a little antiseptic over the site of puncture, and with a clean, sharp needle, soon have our vial a little over half full.

The tourniquet is then removed, and the site of injection given another swab of antiseptic. While we cork the vial and place it in its numbered hole, cleanse our needle and get ready for the next animal, our helper has ear tagged the cow in the upper part of the right ear.

Packing the Samples

When we get home, we see that each vial is tightly corked, and then we mark the correct number on the top of the cork and the sanded portion of the vial with a blue glass pencil. The vial has already been marked on the bottom with our key number. It is not a good plan to use an indelible pencil for marking, for any dampness will cause the figures to smudge.

Suppose we have 30 samples from six herds: J. A. Nelson with eight; C. E. Bowers with four; Fred Smith six; George Dahlberg three; Sam Clark two, and John Adair seven.

We tear off a strip of soft cotton about three inches wide, and place vial No. 30 in it, and wrap around the vial once; then vial No. 29, and so on until we have securely wrapped six, which we pack into our container. We then wrap six more in the same fashion, and so on until we have wrapped No. 1 last. We use plenty of cotton and containers, and out of over 8,000 samples, we have had just two broken in transit, and this was probably due to the cork being pushed in too tight.

When we have our container filled, we take a small piece of paper and write the following:

J. A. Nelson, Avon
1-2-3-4-5-6-7-8
C. E. Bowers, Avon
9-10-11-12
Fred Smith, Avon
13-14-15-16-17-18
George Dahlberg, Troy
19-20-21
Sam Clark, Troy
22-23
John Adair, Troy
24-25-26-27-28-29-30
A 8-24

Our key number is A, and we always write the date on this data. When the container is opened at the laboratory, No. I vial comes out first, and so on down to No. 30 last. With each owner's numbers written out in full, the laboratory has little difficulty in identifying each one.

Good saddle ponies are still useful in the Idaho cow country.

We apply chloroform and tannic acid, four to one, to the top of each container, which makes a rather rough surface on the tin. With a red glass pencil we mark the letter "A", and with a blue glass pencil mark the date.

When we receive a number of containers from the laboratory, we clean off the tops well with chloroform and cotton, and also paste on the addressed franked labels (P32). They are then ready for use.

Our 33-A reports, typewritten in duplicate, are sent in a separate envelope. The

mail leaves our postoffice at seven in the evening and reaches the Boise laboratory the next afternoon.

We have had few unsatisfactory samples due to the mother's care we give them. Chilled soon after the blood is drawn; packed as soon as we get home and placed in the electric refrigerator until the mail is ready to leave that evening, they reach their destination in fine condition.

We think an improved container could be devised, so that each sample would have its numbered compartment. If the samples do not reach the laboratory in good condition, there is no use taking them.

Making Out Reports

When we arrive home, and have our samples safe in the refrigerator, if there are no emergency calls, we start in on our reports.

First of all, we fill out the agreements, and place them in a clip, with a small piece of pink paper showing the date.

Second, we fill out a small filing card showing the day's work, as follows:

Aug 24 Mon m c
5 am -- J A Nelson --- 7 am - 36 - 8
7 am -- M E Bowers -- 8 am - 4 - 4
8 am -- Fred Smith - 9 am - 2 - 6
9 am -- Geo Dahlberg - 10 am - 8 - 3
10 am -- Sam Clark - 11 am - 2 - 2
11 am -- John Adair - 1 pm - 22 - 7
74 30
Antiseptic -- 75¢ 3.70

4210 - 4284

Filing card, showing day's work, time, mileage, and cattle tested in compact form.

On this card, "m" denotes the miles travelled; "c" for the number of cattle tested; the 3.70 stands for the 74 miles at five cents per mile. On that day, also, we spent six-bits for antiseptic, and the lower left hand figures are our speedometer readings.

Here, in a small space we have all the data needed for our semi-monthly and monthly reports, such as the 9-A; T-67; 1012; T-49 and 33-K. At the end of the month, we place a rubber band around them, and file them away. We can thus refer to any day's work since we started.

Generalized tuberculosis. Two reactors were found among 2,000 tested in our county.

When we get our record book almost full, we make an index using the last 20 pages for this purpose. This shows the page number of the owner's herd; number tested and date. Also, whether it is a re-test; suspects; replacements; brand and tagging or a post-mortem.

The easiest way to make this index is to write the owner's names and data on a sheet of paper, and when a page is full, cut them in small strips. When all are completed, they are assembled alphabetically.

Each one of our four record books contains about 400 names, all indexed as above, and we find it very convenient to have for referring to re-tests, change of owners and the like.

Each day, as we test them, we address envelopes to the owners, so that when the reports come back from the laboratory we can make out our 33-B, attach it to the carbon copy of the agreement, and place it in the addressed envelope and mail it out that evening. We send in the original of the agreements with our semi-monthly 9-A reports.

By keeping our reports up to date, and with the aid of our filing cards showing each day's work, we can make out our monthly reports in several hours. Of course, being our own typist helps somewhat.

We have a thin board, ten by fifteen inches, to carry our indemnity sheets with the carbon paper. We found that if we explained slaughter reports very carefully to the owner, we had little trouble.

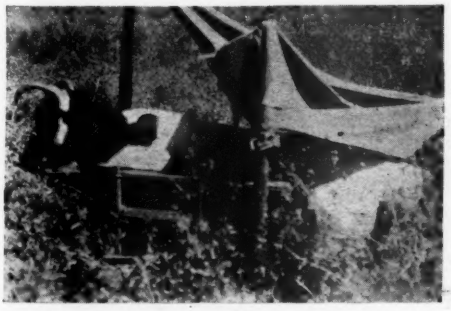
Driving out to a ranch to brand and tag the best cow on the place requires tact and

diplomacy. However, our people have been very sensible about it, and their checks have been arriving about 60 days from the date of slaughter.

We perform a number of postmortem examinations on animals slaughtered for food as the nearby lumber camps offer a ready market for fresh beef.

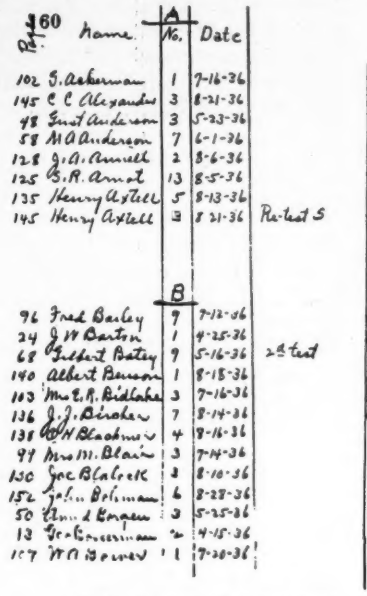
The Human Side

One sees a continual round of comedy, tragedy and human nature in doing the work.

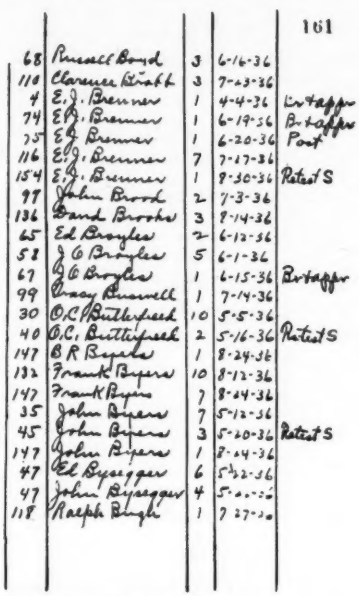


This cow was down six days with milk fever. Finally recovered.

Last week our first stop was with an elderly farmer whose left hand was bandaged. He explained the injury was due to a little domestic friction. It seems his daughter had married one of the most high-



160	Name	A No.	Date	
102	S. Ackerman	1	7-16-36	
145	C C Alexander	3	8-21-36	
98	Ernest Anderson	3	5-23-36	
58	M A Anderson	7	6-1-36	
128	J. A. Arnell	2	8-6-36	
125	B. R. Arnold	13	8-5-36	
135	Henry Axtell	5	8-13-36	
145	Henry Axtell	3	8 21-36	Re-test S
		B		
96	Fred Bailey	7	7-12-36	
24	J W Barton	1	4-25-36	
68	Gilbert Batey	9	5-16-36	2nd test
140	Albert Benson	1	8-15-36	
103	Mrs. E. R. Bidlake	3	7-16-36	
136	J. J. Bircher	7	8-14-36	
138	O. H. Blackmore	4	8-16-36	
99	Mrs M. Blair	3	7-14-36	
130	Joe Blalock	3	8-10-36	
152	John Bolman	6	8-28-36	
50	Elmer Bogan	3	5-25-36	
13	Joe Bonnesman	2	4-15-36	
107	W O Bowen	1	7-20-36	



				161
68	Russell Boyd	3	6-16-36	
110	Clarence Brabb	3	7-23-36	
4	E. J. Brenner	1	4-4-36	Ex tagger
74	E. J. Brenner	1	6-19-36	Ex tagger
75	E. J. Brenner	1	6-20-36	Poor
116	E. J. Brenner	7	7-17-36	
154	E. J. Brenner	1	9-30-36	Retest S
97	John Brock	2	7-3-36	
136	David Brooks	3	8-14-36	
65	Ed Broyles	2	6-12-36	
58	J G Broyles	5	6-1-36	
67	J G Broyles	1	6-15-36	Ex tagger
99	Casey Brunnell	1	7-14-36	
30	O. C. Butterfield	10	5-5-36	
40	O. C. Butterfield	2	5-16-36	Retest S
147	B R Byers	1	8-24-36	
132	Frank Byers	10	8-12-36	
147	Frank Byers	7	8-24-36	
35	John Byers	7	5-12-36	
45	John Byers	3	5-20-36	Retest S
147	John Byers	1	8-24-36	
47	Ed Byerregger	6	5-22-36	
47	John Byerregger	4	5-20-36	
118	Ralph Bugh	1	7 27-36	

Index in end of record book. Valuable for quick reference.

ly worthless young men in the whole state of Idaho, and she is suing him for divorce. The irate husband had visited his wife's home, and in the argument that followed our rancher had fractured a knuckle fondling his son-in-law's nose.

The same morning we tested the cattle of a widow, whose husband had won the Distinguished Service Cross in France, and the only one, we think, in our county.

At another place we came across a hopelessly blind man listening to a radio his neighbors had given him for Christmas. An adjoining ranch housed an old lady, totally deaf, and whose chief recreation was reading. On our next trip by her place we left a box of old magazines.

Back in the woods, we tested several cattle belonging to a family who had moved in not long ago from the drought stricken area of South Dakota. They had just

enough money to make a payment on a forty, and it was amazing to see the optimism and industry they were displaying in their new home. We spent over an hour with them, giving them a few hints on conditions here in Idaho.

Our last call that day was to a large ranch owned by a buxom Irish widow, whose name we may call O'Mulligan. She greeted us with:

"Oi niver heerd tell of this bangin disease, but if any of our cows has it, we don't want 'em. It ain't ketchin to us, is it?" she inquired anxiously, as her equally large and robust daughter looked on.

She then proceeded to tell us that the late, lamented Mike O'Mulligan, God rest his sowl, had gone back to the Maple clinic, at Rochester, Minnesota, to be treated for a breakin' out on his liver. While the operation was a grand success, Mike passed away getting well, leaving half a section of good wheat land to his bereaved widow.

We could continue for many pages narrating these little human epics that we see day after day.

Summary

In Idaho, about twenty practitioners have been doing Bang's disease testing in their respective communities. Very little friction has occurred, for each man is familiar with conditions in his territory, and can handle it accordingly.

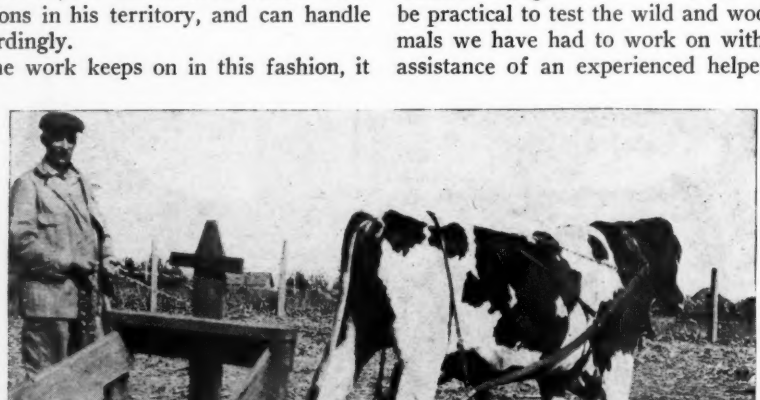
If the work keeps on in this fashion, it will enable many young veterinarians to locate in good live stock sections which heretofore have been unable to support a competent practitioner, but need one. County agents can thus lay away their hypodermic syringes, and devote more time to birth control among potato bugs.

In Idaho, we have had splendid cooperation between the federal and state officials and the practitioners. The federal inspector in charge and his assistants have given us every possible aid in making our reports and in the best methods of doing the work.

In return, the veterinarians should endeavor to make friends for the work, so that cattle owners will demand the test instead of fighting it. Elimination of Bang's disease from our cattle will bring the same financial returns to our stock owners that the successful fight against bovine tuberculosis has done.

We regard our work in the campaign just the same as we do any other part of our practice. It has widened our acquaintanceship over the county, and, while the job has often been hard and tiresome, we are repaid in seeing its value in this short space of time.

A recent ruling of the Bureau has terminated the services of helpers in Bang's disease testing. We do not see how it will be practical to test the wild and woolly animals we have had to work on without the assistance of an experienced helper. The



An Idaho Guernsey Bull used for Draft. He is worked every day.

fact that our assistant has handled and restrained 9,000 cattle without injury to an animal or to ourselves shows the value of a man who knows his business. In our opinion, a helper in blood testing is absolutely essential to safe and efficient work.

Our state officials have also made every effort to work with the practitioners in testing, and our appreciation is due them for their cooperative work.

IRON AND COPPER IN THE DIET

A small daily dose of dilute iron and copper sulphate given to pigs suffering from nutritional anemia and nodular worms resulted in larger and more profitable gains despite the fact that the treated pigs had more worms at the end of the test than the untreated ones.

The test was conducted at the National Agricultural Research Center at Beltsville, Md., under the direction of the Bureau of Animal Industry.

Previous experiments have shown that the iron-copper solution was beneficial for pigs suffering from nutritional anemia. The recent test showed that the pigs thrive when the solution is added to the daily ration. The tonic improves their physical condition to the point where they are able to withstand the effects of parasitism.

The iron-copper solution is prepared by adding one ounce each of ferrous sulphate and copper sulphate to one-half pint of water. This basic mixture is diluted again by adding one part of it to 800 parts of water. In the tests a dose of about one teaspoonful was mixed with the daily ration.

Four groups of pigs, all suffering from nutritional anemia, and artificially infected with varying numbers of nodular worms, were studied in the experiment. Although all were fed the same ration, the treated pigs made the better gains.

"Feeding the iron-copper solution apparently enabled the treated pigs to withstand the effects of the parasites and make more rapid gains in weight, even though more heavily infested at the end of the test. It would seem that the chemicals were beneficial to the worms as well as to the pigs. On the other hand it is possible that the nutritional anemia from which the untreated pigs were suffering was detrimental to the parasites as well as the pigs."

QUALITY OF GRASS IN PASTURES CHANGED BY USE OF FERTILIZER

Richer soil in pastures makes richer feed for the animals. By applying fertilizers to pasture soils it is possible, in some cases at least, to improve the quality and feed value of the grass plants as well as to increase the yield. This is the result of experiments at the Beltsville Research Center.

Livestock men have long known that there is a difference in the nutritive value of grasses growing on different soils and in different sections of the country. More recently it has been recognized that in several parts of the United States there is actual malnutrition of grazing animals, that the animals do not get from the grass enough of all the kinds of feed materials that they require. The most common deficiency is a shortage of phosphorus. Animals that do not get enough phosphorus on pasture try to make up the deficiency by chewing decaying and weathered bones. In some parts of Florida, there is a disease of range cattle known as "salt sick" which has been traced to a deficiency of iron and copper in the herbage.

MASTITIS AND PELVIC DISEASES

In future studies of chronic mastitis in cows it appears exceedingly important to consider the possible relations mastitis bears to diseases of the ovaries, tubes and uterus. The study of 261 human cases of mastitis by Taylor (*Surg. Gynocol. and Obst.*, March, 1936) show that such a relation exists together with endocrine disorder. Ovarian cysts, salpingo-oophoritis, endometral hyperplasia, hyperactivity of the ovary, abnormal menstruation, parametritis, retroversion of the uterus, endocervicitis, and various types of pelvic disorders co-existed with pain, swelling of the breast, and nodularity of the mammary gland. This author says that a slight endocrine disturbance may cause local mammary hyperplasia.

A Rapid Test for the Detection of Latent and Clinical Mastitis

By GLENN C. HOLM and DONALD F. EVELETH,
Department of Veterinary Hygiene and the Veterinary Research Institute, Iowa State College, Ames, Iowa

REPEATED outbreaks of clinical mastitis in dairy herds under careful supervision have demonstrated a definite need for a simple means of diagnosing the latent or sub-clinical type. The leucocyte count and differential leucocyte count have been used for this purpose, but require considerable technical skill and time. In three herds studied over a period of three years by one of the authors (G. C. H.) all animals positive by palpation or the chloride test have been isolated and careful sanitary procedures followed. The incidence of mastitis has not decreased in these herds since young animals nearly always developed a more or less acute type. A color test developed in this laboratory for the field diagnosis of both clinical and latent mastitis is described.

The test is a modification of the original Storch[1] procedure for detecting boiled milk. Later one of the reagents, paraphenylenediamine, was used for the detection of hydrogen peroxide adulteration of milk. Certain enzymes in body fluids, when in the presence of hydrogen peroxide and paraphenylenediamine, produce a blue gray color. If hydrogen peroxide is added to milk and an incubation period allowed, the hydrogen peroxide will be decomposed. This reaction is made use of in the catalase test for mastitis. In the test to be described a very small amount of hydrogen peroxide is added to the milk and a short incubation period allowed. If an abnormally large amount of catalase is present, little or no color will develop on the addition of paraphenylenediamine.

Method

Reagents—(a) Freshly prepared 2% aqueous solution of paraphenylenediamine dihydrochloride. (b) A 0.005% aqueous solution of hydrogen peroxide.

Apparatus—1. *Test tubes and test tube racks*: Serological test tubes, with inside measurements of 1cm. by 10cm. are satisfactory. A Wassermann type test tube rack having two rows of holes for tubes meets the requirements. The tubes in row 1 are used for controls and the tubes in row 2 are used for the test proper.

2. *Pipettes*: Two 1cc syringe pipettes are most convenient, however, ordinary glass pipettes can be used.

3. *Sampling Containers*: The samples may be taken in test tubes, glass bottles or the strip cup sampler.

4. *Basins or beakers*: These for rinsing the syringe pipettes.

5. *Buckets or pans*: These are required for rinsing sampling containers if the test is performed in the field.

Note—The equipment listed is fully described and illustrated in Veterinary Medicine, XXXI: 292-295 (1936).

Technique—(1) One cc of milk is measured into each of two test tubes (control and test proper). (2) One cc of 0.005% hydrogen peroxide is added to each test tube and mixed. (3) One drop of the 2% paraphenylenediamine solution is immediately added to the control tube and mixed. (4) After five minutes at room temperature, 20-25° C., a drop of the paraphenlyenediamine solution is added to the other tube and mixed. (5) After two minutes the colors of the two tubes are compared. Depending on the intensity of the mastitis, the milk in the test proper will range in color from that of the control (slate blue) to white. The color approaches white as the intensity of the mastitis increases. Practice is required to differentiate borderline reactions. Where very slight differences in color are observed it is advisable to make a differential leukocyte count. In most cases, however, the differentiation between

mastitis and normal milk is not difficult. Rather exact timing is necessary since the amount of H_2O_2 is small and positive results will be obtained in normal milk if too long a period elapses between addition of the hydrogen peroxide and the paraphenylenediamine.

The reagents are not permanent and must be freshly prepared. The paraphenylenediamine can be weighed on a pharmaceutical balance. The hydrogen peroxide must be standardized carefully. A solution that is too weak will give positive reactions while a solution that is too strong will give negative results. The hydrogen peroxide should be standardized by potassium permanganate titration. One cc of the 3% hydrogen peroxide stock solution is diluted with 25 cc of distilled water and 2.5 cc of 10 N sulphuric acid added. Titrate to a definite pink endpoint with 0.1 N potassium permanganate. The calculation of the hydrogen percentage peroxide is then made by the following formula:

$$\text{Per Cent } H_2O_2 = \frac{\text{cc } KMnO_4 \times KMnO_4 \times 1.7}{\text{cc. } H_2O_2}$$

From the percentage hydrogen peroxide in the stock solution, the exact dilution to give 0.005% may be calculated.

Discussion

The color test has been compared with the leucocyte count,[2,3] the differential leucocyte method[4], the modified catalase test[5] and the chloride test[6,7]. Samples were obtained from individual quarters of 50 cows from three herds. All of the tests were made simultaneously on each sample. If a single quarter were positive for mastitis, by any of the tests, the animal was considered diseased. The results expressed as percentage positive were: chlorides 64%; catalase 60%; leucocyte count[8] 84%; differential leucocyte count 80% and color test 80%. The results in this study are similar to those obtained by Starr and his associates[9]. No single laboratory or field test is entirely satisfactory for the diagnosis of all cases of mastitis. The ease with which the described test may be made in connection with the modified chloride test[7] makes it valuable, as many cases of subclinical mastitis will react to the color test but still fail to give a positive chloride test.

Data are not available over a long period to establish definitely, the prognostic value of this color reaction in determining very mild cases of mastitis. Two of 50 animals examined gave positive reaction with the color test but negative to all others. Further tests will be necessary to ascertain this point. In general, the correlation has been satisfactory between the test just described and the leucocyte count.

Some samples of hydrogen peroxide have not been satisfactory. Permanganate reducing substances are present which do not react in the presence of milk and paraphenylenediamine to give a blue color. These samples will give very misleading results. If a definite blue color does not develop in two minutes in the control tube, the hydrogen peroxide should be discarded and peroxide from another source used.

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A Rapid Test for the Detection of Latent and Clinical Mastitis

By GLENN C. HOLM and DONALD F. EVELETH,
Department of Veterinary Hygiene and the Veterinary Research Institute, Iowa State College, Ames, Iowa

REPEATED outbreaks of clinical mastitis in dairy herds under careful supervision have demonstrated a definite need for a simple means of diagnosing the latent or sub-clinical type. The leucocyte count and differential leucocyte count have been used for this purpose, but require considerable technical skill and time. In three herds studied over a period of three years by one of the authors (G. C. H.) all animals positive by palpation or the chloride test have been isolated and careful sanitary procedures followed. The incidence of mastitis has not decreased in these herds since young animals nearly always developed a more or less acute type. A color test developed in this laboratory for the field diagnosis of both clinical and latent mastitis is described.

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Azochloramid in Veterinary Practice

By R. L. BOOTH, Middleburg, Virginia

ABOUT a year and a half ago my attention was drawn to Azochloramid, a new chlorine compound, recommended for the treatment of infected wounds, which has been accepted by the Council on Pharmacy and Chemistry of the American Medical Association. This compound, it was claimed, distinguished itself from other chlorine derivatives by its stability, particularly in the presence of such organic materials as pus, serum and fecal matter. Where other chlorine solutions quickly lose their strength when brought into intimate contact with such materials, Azochloramid was stated to retain its potency for a prolonged period, permitting the application of a chlorine dressing to an infected wound at much longer intervals than was heretofore possible.

This is a brief report concerning itself with my experiences with this compound in the treatment of various types of infected and contaminated wounds. Brief case records on a total of seventeen cases are cited. Azochloramid was used in probably twice that number of additional cases of lesser importance. In each case where Azochloramid treatment was employed, both in those reported and in those not reported, satisfactory healing took place.

The cases were encountered in the routine of general veterinary practice, all being of a traumatic nature with the exception of three apparently spontaneously occurring abscesses in dogs and one postoperative treatment of fistula of the withers in the horse. All other subjects were of the equine species, mostly Thoroughbreds. Roughly, the cases may be divided into the following classes:

1. Packing abscesses—horses, 2; dogs, 3.
2. Exposed bone—horse, 1.
3. Deep coronary wounds—horse, 2.
4. Large skin wounds—horse, 2.
5. Deep flesh wounds—horse, 4.
6. Open tendon sheath—horse, 2.
7. Postoperative fistula of the withers—horse, 1.

IN general two methods of application of Azochloramid were followed in the treatment of the various types of cases. Due to the fact that a relatively small part of the body of the horse lends itself to satisfactory bandaging, most of the wounds were treated without the protection of surgical dressings. The use of a gauze wick moistened with Azochloramid in triacetin has been the method employed in packing abscesses and in its application to wounds under bandage. In the treatment of open wounds Azochloramid in triacetin was merely flowed sparingly over the exposed tissue with a cotton applicator, with the precaution that it should reach all parts of the wound. In all cases during the course of treatment wounds were washed with either Azochloramid saline solution or an aqueous solution of an aromatic thymolene antiseptic before the application of Azochloramid in triacetin, except where it was deemed inexpedient to disturb even to this extent the fragile new granulation cells of wound surfaces.

Large superficial and deep penetrating wounds were treated by application of Azochloramid in triacetin to the wound surface. Abscesses, after evacuation, were flushed out with either Azochloramid saline or the aforementioned thymolene antiseptic solution, and packed with the Azochloramid wick.

Coronary wounds, involving the lateral cartilages of the horse's foot, in which healing is slow and tedious, due to the poverty of circulation of the cartilage, were dressed by means of application of a wick to the wound, either after suturing, or, in the case of a wound several days old, under a bandage by means of which moderate pressure was applied to help preserve the proper shape of the hoof head. Where a large area of the front and side of the metatarsal bone of the horse was exposed, the application of the Azochloramid wick directly over the bone and denuded flesh

was practiced. It was found desirable in bandaging over an Azochloramid wick to apply a small piece of wax paper over the wick to prevent the antiseptic from being absorbed by the dressing which held it in place.

A case of fistula of the withers was treated after operation by irrigation with Azochloramid saline and applications of Azochloramid in triacetin to the wound daily. It healed rapidly with very little suppuration. An open extensor tendon sheath in front of the hock was treated open with daily applications of Azochloramid in triacetin, and a wound exposing the flexor tendon sheath below the fetlock was treated under bandage.

One case of especial interest in demonstrating the bactericidal efficacy of Azochloramid was that of a two-year-old Thoroughbred filly which suffered an extensive laceration of the medial side of the hind leg between the stifle and the hock, necessitating suturing of the wall of the saphenous vein and ligation of several of its branches. Treatment of this case was begun with applications of a spray of equal parts of 70% alcohol and saturated solution of boric acid, over which was applied an antiseptic dusting powder twice daily. The animal was confined in a box stall bedded with straw. There was a great deal of serous exudation and suppuration, with the formation of crusts of pus on the wound surfaces. After about a week, this treatment was supplanted by flowing Azochloramid in triacetin gently over the wound every 24 to 48 hours. Suppuration and exudation ceased immediately and the wound filled with healthy granulations and healed uneventfully.

As a result of this experience with the use of Azochloramid in veterinary practice there have appeared several distinct advantages in its use in treating wounds on animals. Due to its prolonged activity as a bactericide, dressing wounds every day is not a necessity, even when animals are confined to box stalls bedded with straw, which, by their movements is stirred up, casting into the air its abundant bacterial flora. Azochloramid's bactericidal quality is enhanced by its slight interaction with tissue; consequently it is but slowly vitiated. Due to its lack of irritating qualities it has the added advantage of controlling serous exudation and exuberant granulation. The oily consistency of Azochloramid in triacetin prevents dressings from sticking to wound surfaces which are bandaged, and forms a protective film over exposed wounds. Since a very small quantity is needed in dressing a wound, the treatment is not an expensive one and is thus compatible with the therapy of animals, the economic value of which often prevents costly treatments.

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In some ways we are so obsessed with the delight and advantage of discovery of new things that we have no proportionate regard for the problems of arrangement and absorption of the things discovered—*Sir Josiah Stamp.*

1936 DROUGHT PURCHASES

Only 3,761 head of cattle and calves were bought in 1936 in the drought cattle campaign of the federal government. This compares with purchases of 8,287,786 cattle and calves in 1934. Of this number 6,787,000 were slaughtered for food and 1,500,000 were destroyed on farms. Sheep purchases in the drought year 1934 totaled 3,609,773 head, of which 1,404,000 were slaughtered for food and 2,205,000 were destroyed on farms. This year's purchase of drought cattle and calves was conducted at five markets—Chicago, St. Paul, Omaha, St. Louis and Fargo, N. Dak. In 1934 purchases were made largely on farms and ranches, and such animals as could be shipped were sent to central markets for slaughter, the meat being used for distribution by relief agencies.—*National Provisioner.*

VETERINARY OBSTETRICS

Veterinary Obstetrics is that branch of veterinary medicine which deals with the normal and abnormal reproduction of our domestic animals, and which the practicing veterinarian must be able to handle in a satisfactory manner if he is to be successful in his practice, and if the livestock industry is to prosper.

Normal parturition is a physiologic function wherein the maternal animal gives birth to its offspring. Dystocia is the condition when normal parturition cannot take place. Dystocia may be of three kinds, maternal or fetal, or both. When a veterinarian is called to a case of difficult parturition, he first makes an examination of his patient to determine what the trouble may be. If it is maternal very little can be done to correct the malformation. If it is fetal and an abnormal presentation, he must be able to make correction, and normal parturition can proceed.

When a veterinarian is called to a case of bovine dystocia and the patient is a heifer of an inferior size or the fetus is unusually large, or both, and normal parturition cannot take place, the veterinarian is up against a stone wall, and is lost in knowing just what to do in order to save the life of both the patient and offspring. You have in these cases worked hard and by the time you were through you had pieces of the fetus scattered about the place, the patient in such a condition where recovery was a question, the owner disappointed, and yourself worn out, and in a few days learn that the patient had died. You have worked hard, the patient has suffered great pain and the owner has nothing but a bill to pay.

In view of the foregoing, I have directed my efforts toward cesarean section in cattle, and must say the results have been very gratifying to myself and the owner as well. In several cases the dam and offspring were both saved, and as a result I have established a creditable reputation in the community for handling such cases.

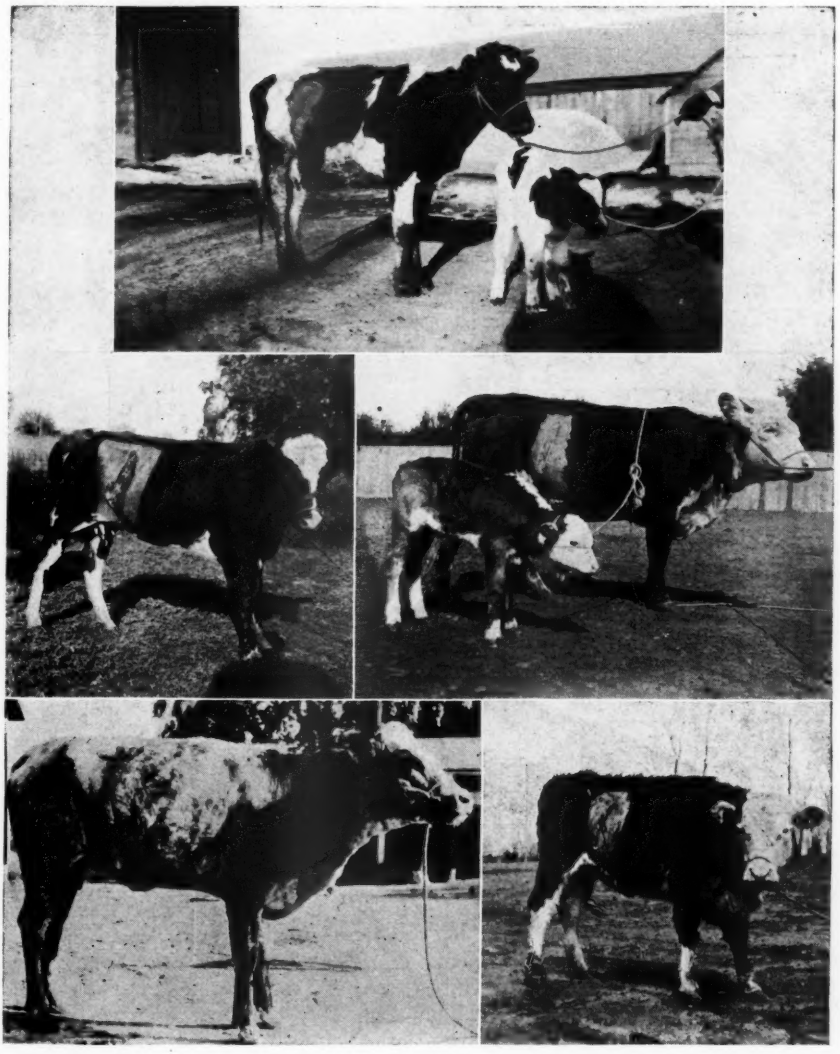
When I am called to a case of bovine dystocia, and upon examination find that presentation of the fetus is such that a correction would endanger the life of the patient or where the fetus is very large and the pelvic girdle small, in other words, a condition where normal parturition cannot take place without danger of killing one or both, caesarean section is performed as follows:

Epidural anesthesia is induced in the usual manner with 20 or 25cc of a 3% solution of novocaine. After the injection has been made, the field is prepared on the right side. The hair is shaved over a space twelve inches wide between the external angle of the ilium and the last rib and from the short ribs down to the flank. Tincture of iodine is applied to the skin and mopped with alcohol. By this time the patient is ready to go down, when down, a rope is placed about the hind legs and fore legs and the patient is stretched just snug, not too tight. A helper is placed at the head to prevent it from being swung about. I make an incision 12 or 14 inches long as the case may be, only through the skin, then I place a sterile sheet three feet square with a slit cut in the center over the patient, and the opening of the sheet is sutured to that of the skin with a continuous stitch, using linen. The abdominal muscles are divided with scissors, having one sharp and one dull point. The peritoneum is also divided with the scissors. When the laparatomy is complete, the small intestines are pushed forward, and just enough of the gravid uterus is brought out to make the hysterotomy. The incision in the uterus is also made with scissors, on its dorsal surface where the least hemorrhage would occur. The assistant now holds the margins of the uterus, the fetus is grasped by the legs and brought out, the umbilicus is ligated and it is ready for the receiver. The uterine incision is closed with a continuous Czerny suture folding the margins inward and doubling back to make sure that no leaking will take place. I use No. 2 or No. 4, 20-day, chromic gut, the same suture is used for the peritoneum, the muscular layers are approximated separately, using No. 4, 20-day chromic gut. The skin incision is closed with a strong linen interrupted suture leaving a small opening at the bottom

for drainage. An oil-treated, bandage wick is inserted under the skin and left in place for twenty-four hours. Care must be taken that drainage continues. In fly time, the skin suture may be painted with oil of tar, or any similar material. The afterbirth may be removed after the operation is complete or the next day.

In the after care, place the patient in a clean box stall or small enclosure with clean bedding, give laxative feed and plenty of fresh water, to which a small amount of salt may be added. The skin sutures are removed in from 14 to 16 days and by this time the patient should be doing nicely.

Two of my cases have not even had a rise in temperature, never missed a feeding



Cows operated upon (cesarean section) by Doctor Witt. The one at the left in the middle row was operated upon at the Nebraska State Clinic, July 13, 1936.

and looked as though nothing abnormal had taken place. One thing to remember is this, after you have examined your patient, make up your mind what you are going to do, do not try delivery by using block and tackle, wearing out your patient, then decide to operate and expect a favorable outcome—you are not going to have it, your patient will go to the bone yard.

One very important thing is—work fast, yet do it well! In my 22 years of practice I have had nothing which has given me more satisfaction than the cesarean operation in cattle.

BERNHARD WITT.

Scribner, Nebr.

URETHRAL CALCULI IN A STEER

June 16, 1936, I was called to see a Guernsey steer, 18 months of age, with a history of having difficulty and exhibiting pain during urination. These symptoms had been noted for 10 days. At the time of examination the animal was extremely depressed, with respiration accelerated and temperature slightly elevated. The abdomen as shown in illustration No. 1 was enlarged and edematous from the sternum to the pubis.

A diagnosis of urethral calculi and possibly cystic calculi was made by myself and Dr. R. P. Wagers, now of Ohio State University. A urethrotomy was performed with 1½ ounces chloral hydrate given orally as a general anesthetic. The animal was placed in dorsal recumbancy and the operative area ventral to the ischial arch prepared.

A two-inch incision was made on the median line, through the skin, subcutaneous tissues and the bulbo-cavernous muscle and the penis isolated. An incision was then made into the urethra. A sterile catheter was passed through the incision into the bladder. No calculi were found at this point. The catheter was then passed in the other direction and calculi located as usual posterior to the sigmoid flexure were found. The submucous tissue of the urethra was then sutured to the skin with catgut and the animal kept under anesthesia for 10 hours.

The steer made a rapid and uneventful recovery and is popularly referred to as the "cow-steer." Illustration No. 2 shows the area of operation and No. 3, the steer fully recovered.

This is the first case of this kind I have had to handle during 35 years of practice.

GEORGE U. MARCHAND.

Uhrichsville, Ohio.

Fig. 1

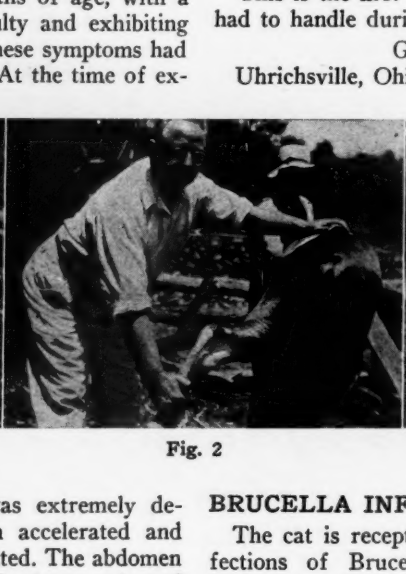


Fig. 2

Fig. 3

BRUCELLA INFECTIONS IN CATS

The cat is receptive to experimental infections of Brucella organisms injected subcutaneously or intraperitoneally. The symptoms incited are weakness, loss of appetite, loss of flesh, conjunctivitis, cough, and tumefactions of articulations. In general, the symptoms are not pronounced and the duration of the infection variable. Soon after the inoculation agglutinins appear in the blood, then disappear. The reaction varies between 1:500 to 1:32,000. —*Deut. Tier. Woch.*

OLD AND NEW WOUND TREATMENT

The article on page 458 of the October number of VETERINARY MEDICINE, "Maggot Study Yields New Facts on Urea" intrigues me.

I have been much interested during the past several years in watching reports of the use of maggots in wounds.

The value of urea as a healing agent has been empiric knowledge(?) among farmers, teamsters and others for many years. Not in its pure crystalline form it is true, but in its crude form, i.e., urine. I recall very vividly, way back about 1890 having a severe case of chapped hands, due to exposure to cold and dampness, shucking wet, frozen corn in the fields of northeastern Ohio. Upon my complaining of sore hands I was insistently advised by the old farmer with whom I lived to urinate on my hands several times daily. Believe it or not, my hands healed quickly after several applications.

On another occasion I observed the use of urine as a wound application to a large indolent ulcer on the leg of a draft horse. The owner urinated on this ulcer several times daily, and no other treatment was used. Whether or not it did any good the fact is that old ulcer healed promptly after this treatment was instituted.

Among farmers and others in some sections of the country cow manure poultices have been used in the treatment of swellings and wounds of various kinds as most of us well know. Of course, we, as professional men, have always frowned upon such treatments and always have something better and more refined to use or recommend.

While this subject is under discussion it may be well to recall the old mammy treatment for measles, sheep manure tea, so-called, for want of a better name, being simply a strong infusion of sheep manure, sweetened a little, and forced unbeknownst down the gullet of an unwilling patient sick of measles. This treatment was designed to "bring the measles out." The eruption generally followed the copious nauseating draught after a few hours. In my case, as an orphan boy of 15 years, I do know that I soon recovered as a result of, or in spite of, the above treatment. Up to now I do not know which, but they told me that I had a bad case and sheep manure tea was required to "bring them out."

It is apparent that urea has uses to which it is not put in these days. Perhaps there may have been away back yonder some real scientific basis for the multiple uses of this chemical in its crude forms as applied by the older generations that have passed on into the unknown realms of antiquity. Who can say?

W. M. BURSON.

Athens, Ga.

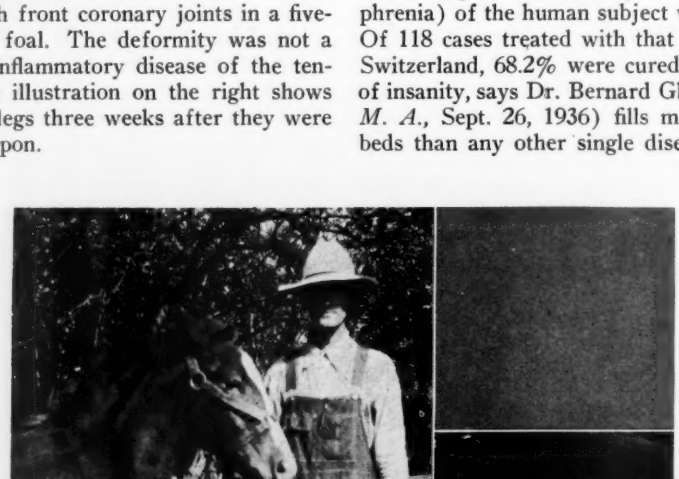
FOLLICULAR HORMONE?

The term "follicular hormone" has been pretty well discontinued in medical literature. It lives in veterinary literature mainly to avoid infringement upon patented products sold under such a confusing group of names as "estrin," "estrogen," "folliculin," "menformon," and others too numerous to mention, all of which simply mean the estrogenic substances that can be isolated in crystaline form from ovarian tissue or the urine of the pregnant.

"Follicular hormone" should be discontinued because the substance it defines is not obtained solely from the follicular fluid of the ovary. In tussling with the problem of naming these practically identical substances having estrus-producing properties, the Council of Pharmacy and Chemistry of the American Medical Association preferred "theelin" as an appropriate name. The name was proposed by Veler, Thayer and Doisy (*Jour. of Biological Chemistry*, June, 1930), but it has not been adopted generally because a commercial house uses that name for its own type product. The Council recommends the term "estrogenic" to describe these extracts, and "estreol," and "estrogen" as appropriate names for them. The patentees of these and similar names have relinquished their proprietary rights at the request of the Council to clear the way for an appropriate identification of these extractives all of which are C-H-O compounds in but slightly different proportions.

KNUCKLING IN A FOAL

The illustration on the left shows knuckling in both front coronary joints in a five-month-old foal. The deformity was not a result of inflammatory disease of the tendons. The illustration on the right shows this colt's legs three weeks after they were operated upon.



Treatment: Plantar tenotomy.

Restraint: Animal cast, given general anesthetic (chloroform).

Technique: Section of the perforans tendons following instructions in Cadiot's Surgery, page 94. Antiseptic dressings were applied for one week under light compress bandages. Iodine was applied to the wound daily. At the end of the third week, the wounds were completely healed; by the end of the fourth week, the tendons had united and very little soreness was exhibited in walking.

G. A. HANDLEY.

Eaton, Ohio.

A promising achievement in medicine is the curing of dementia praecox (schizophrenia) of the human subject with insulin. Of 118 cases treated with that hormone in Switzerland, 68.2% were cured. This form of insanity, says Dr. Bernard Glueck (*J. A. M. A.*, Sept. 26, 1936) fills more hospital beds than any other single disease.

RABIES IN MANILA

Rabies was first recognized in the Philippine Islands in 1920, or 20 years after the American occupation, according to the *Philippine Journal of Animal Industry*. How the Spaniards kept the disease out of the islands during four centuries is not stated, but from 1930 to 1934, the city veterinarian of Manila observed 156 cases. Compulsory vaccination was ordered in 1927, but the regulation was never actually enforced. At the present time stray dogs are impounded and when released to their owners, they are vaccinated against the disease.

Unilateral Exophthalmus Associated with Leukemia in a Cat

By FRANK BLOOM,
Flushing, L. I., New York

Exophthalmus as a disease entity, or more accurately speaking as a symptom, is in itself sufficiently uncommon in veterinary literature to warrant reporting. A review of the literature discloses the fact that there is no mention of exophthalmus due to leukemia in the cat. This may be so because leukemia occurs but rarely in this animal, and as in leukemias of other animals, the orbit is uncommonly affected. Exophthalmus may be defined as a protrusion of the eyeball. Bilaterally, it is present most commonly in Grave's disease in man. Unilaterally, it may result from orbital cellulitis, orbital tumors, orbital periostitis, tenonitis, vascular anomalies of the orbit, changes in the skull, etc., and presents an interesting problem in differential diagnosis. Recently, the writer had the opportunity of observing such a case and the pitfalls in the diagnosis that can occur.

The subject was a nine-year-old, castrated male cat. The animal was first seen July 10, 1936. The history was that for the last ten days the eyelids of the right eye had been very swollen so that the eyeball could scarcely be seen. There was also a swelling of the right side of the face. A veterinarian had been consulted who diagnosed the condition as conjunctivitis. On examination, the palpebral conjunctiva of the right eye was greatly thickened and presented a gaping appearance (chemosis). There was no injection of the conjunctival blood vessels and the conjunctiva was of a dull, diffused, brick-red color. The membrana nictitans was also greatly thickened and protruded anteriorly and laterally to the external canthus. There was a slight mucoid eye discharge. There was a great deal of collateral edema on the affected side. The other eye was apparently normal and the animal appeared in good physical condition. The cornea of the affected eye could barely be seen on separation of the lids but appeared normal with no staining with fluorescein. A tentative diagnosis of conjunctivitis which might possibly be a hyalinization process was made and the usual treatment prescribed. The symptoms that militated against a conjunctivitis was the chemosis, edema and lack of eye discharge.

The animal was seen several times during the next 13 days and the condition had not improved. It was then decided to remove the third eyelid; the operation was performed July 13th. The cornea was thereby clearly visible and was affected with a superficial keratitis. The conjunctiva presented the same appearance as when first seen and no observation was made as to the possible presence of a proptosis. However, it was noticed that the eyeball seemed very tense and was more or less fixed in the orbit. The owner seeing no improvement in the animal's condition consulted another veterinarian who in turn called in an ophthalmologist. A final diagnosis of exophthalmus was made with the suggestion that radiographs of the affected eye be made. August 1st the animal was brought to the writer for a series of x-ray plates which were negative. On examination, it was observed that the chemosis had increased and the right eye protruded about 5 mm. farther than the normal eye. Ophthalmoscopic examination revealed no abnormalities of the fundus. The case again reverted to the ophthalmologist who performed several operations to obtain drainage of the orbit as it was believed that an abscess might be present. Nothing more was heard from the owner until August 28th when the animal was again brought to the hospital. It was learned that several other veterinarians had been consulted and the eye was considered incurable. At this time there was a severe panophthalmitis and the chemosis and edema was noticeably increased. The physical condition of the animal was very poor, it having lost considerable weight and

appeared toxic. On examination, all the superficial lymph glands were enlarged to 6 to 12 times their normal size. A blood count revealed the following:

Red cells—4,137,000 per cmm.
White cells—15,150 per cmm.
Hemoglobin (Wintrobe method)—69% (11.7 gms.)
Differential count—Neutrophiles—64%
Small lymphocytes—7%
Immature lymphocytes—24%
Monocytes—3%
Juveniles—2%

The diagnosis of aleukemic lymphatic leukemia (lymphadenosis with leukemic infiltrations in the orbit causing the exophthalmus was made. Destruction was advised but the owner desired to prolong the life of the animal as long as possible. In view of the fact that the panophthalmitis was so severe it was decided to enucleate the eye hoping that this procedure might somewhat relieve the suffering of the animal; however, a bad prognosis was given inasmuch as the physical condition of the animal was so poor. The animal died several days after the operation and the autopsy report is as follows:

All the external lymph glands are enlarged considerably and readily palpable. The spleen seems to be about twice its usual size with rounded edges and is of a light red color. The liver is normal in size and is almost yellow in color. The abdominal lymph glands and Peyer's patches present no noticeable enlargement. The lymph glands in the thoracic cavity are enlarged. Posterior to the Capsule of Tenon, the orbital fat contains many diffuse yellowish-grey infiltrations which become more dense as the posterior aspect of the orbit is approached.

Histological report by Dr. Jean Oliver, Professor of Pathology of the Long Island Medical College is as follows:

Sections through the eye show complete collapse of the bulb. The iris and parts of the retina can still be recognized. There is an extensive infiltration with polymorphonuclear leucocytes throughout the tissues. External to the collapsed bulb is a mass of lymphadenoid tissue which consists of large atypical lymphocytes, entirely different in appearance from the inflammatory cells previously described, that infiltrate the periorbital fat. Sections of various lymph glands show the architecture of the gland to be entirely destroyed and replaced by masses of atypical mononuclear cells with large oval nuclei. Sections of spleen shows the pulp filled with similar atypical lymphocytes. Sections of liver show a large amount of pigment in the epithelial cells in the centers of the lobules. There are cells of lymphocytic type concentrated in the peri-portal regions. Sections of kidney show no leukemic infiltrations. There is the usual marked vacuolization of the renal epithelium that is seen in the cat. Diagnosis—Leukemia, lymphatic with infiltrations of liver, spleen, lymph glands and orbital tissue.

Discussion

There is no doubt that the initial symptoms such as chemosis, edema, etc., were caused by the leukemic infiltrations in the orbit. As this condition is progressive there gradually was an intensification of the eye condition. When the animal was first seen by the writer, no macroscopic evidence was found of leukemia and exophthalmus but undoubtedly they did exist. During the period of treatment, apparently no physical examination of the animal was made as the leukemia was not diagnosed. It is also of interest to note that the cat apparently suffers a somewhat different type of leukemia than does the dog. The microscopic sections showed a different cell morphology. The stained blood smear showed a type of cell that was difficult to classify. Resort was made to the use of peroxidase staining methods and the cells in question were agranular and appeared to be atypical cells of the lymphatic series.

BLOOD TRANSFUSION IN ANIMAL MEDICINE

The transfusion of blood tardily creeping into veterinary clinical work is gaining a high rating among the cures. A distinguished American surgeon has named it "the king of all tonics." Its more common uses in animals are for weak patients about to be subjected to major operations, post operative depression, purpura hemorrhagica, blood loss, deficient blood values, and hemolytic infections. It is worth a trial in any sinking condition. The reports of remarkable cures brought about by this simple intervention are multiplying in the current literature.

As there is always plenty of blood within reach and no typing to do, except possibly in the horse, the way is wide open for the resort to blood transfusion on a large scale in animal medicine.

Program for Improving Canned Dog Food

Formulation of plans for a Dog Food Division and adoption of a comprehensive program looking toward the improvement of the dog food business has just been announced by the Institute of American Meat Packers.

With a membership comprising approximately twenty of the leading companies engaged in the manufacture of quality dog food, the Institute's Dog Food Division will seek promptly the development and adoption of adequate industry standards. These will include standards as to the protein, fat, moisture, and crude fibre content of dog food and its nutritive ratio, and provision for determining the accuracy of claims made by the manufacturer as to mineral and vitamin content.

It is the present intention of the Dog Food Division of the Institute to admit to membership establishments that are operated under conditions and under a system of inspection and regulation that is satisfactory to the Institute.

A number of America's leading manufacturers of quality dog food have pledged themselves to observe rigid standards for quality canned dog food recommended by the Dog Food Division of the Institute of American Meat Packers, according to an announcement by the Institute.

Standards as adopted provide that canned dog food shall contain a minimum of 10% of protein, 75% of which must be of animal origin; a minimum of 2% of fat; a maximum moisture content of 74%; a maximum crude fibre content of 1.25% and a nutritive ratio not greater than 2.0.

This minimum standard is far above that of many canned dog foods at the present time. It is notwithstanding subject to criticism for being low in fat and protein and even more for not being more specific as to the protein content—hair horns and hoofs are proteins "of animal origin" but obviously not suitable for dog food.

The standards further provide that in cases where claims are made by a manufacturer as to mineral and vitamin content, satisfactory support of the accuracy of such claims must be submitted for approval to the Referee Board of the Dog Food Division. In this matter of advertising claims the Institute is following a policy established by VETERINARY MEDICINE two years ago.

In addition to adopting minimum standards, the manufacturers referred to also have adopted terms defining canned dog food and edibility, as follows:

Canned Dog Food—The term "canned dog food" is interpreted to mean a commercially sterile canned food of such appearance, odor, and consistency as to be savory, wholesome, and nutritious for dogs; said dog food to be composed of edible meat or meat by-products and/or cereals, and/or other accessory edible food products, and/or certain mineral—and vitamin-containing substances necessary to meet the nutritive requirements as claimed.

Edible—The term "edible" shall be construed to mean suitable with respect to quality and quantity of each ingredient used and with respect to the conditions of manufacturing and handling. In the case of the manufacturer operating a federally inspected establishment, production and handling under inspection and regulations of the Bureau of Animal Industry of the United States Department of Agriculture shall be *prima facie* evidence of the suitability with respect to cleanliness and freedom from disease. In the case of a manufacturer operating a non-federally inspected plant, if the conditions and regulations and inspection under which he operates are deemed adequate by the Institute, production and handling under such inspection and regulations shall be *prima facie* evidence with respect to cleanliness and freedom from disease.

Membership in the Dog Food Division is open to establishments producing quality dog food that operate under conditions and under a system of inspection and regulation satisfactory to the Institute and also that agree to abide by the foregoing standards

and other regulations which may be prescribed by the Dog Food Division.

The effective date of the standards will be decided at an early meeting of a group of interested dog food manufacturers.

Countering this move for the improvement of canned dog food a group comprising manufacturers of uninspected canned dog food have organized the "American Dog Food Institute" with the stated purpose of "improving standards of manufacture and business procedure by self-regulation and by co-operation with federal, state and municipal officials and other members of the industry wherever possible."

VETERINARY MEDICINE has warned its readers so often against the use of uninspected canned dog foods that further comment seems unnecessary. It may be mentioned, however, that those active in the "American Dog Food Institute" are in the main those who were active in attempting (unsuccessfully) to put over a nefarious canned dog food code two or three years ago and later formed a canned dog food manufacturers' association (short-lived), the object of which was fully exposed in VETERINARY MEDICINE at the time. It was the operators of non-inspected plants whose products Senator Dickinson described last spring as "a product of filth and putrefaction."

SUCCESSFUL EASTERN IOWA MEETING

At the 23rd annual meeting of the Eastern Iowa Veterinary Association in Cedar Rapids, October 20 and 21, 1936, the discussion of swine disease led all other subjects in time and the number participating. A greater prevalence and wider extent of enteritis was reported than has occurred heretofore. The same experience was reported with other filth or "yard" diseases, all having caused excessive morbidity and heavy mortality. An increased prevalence of hog cholera during the fall months was reported. It offered many complex problems because of the enteric diseases already referred to and also because of common infestations of roundworms, lungworms, thorn headed worms and coccidia and of mange, stomatitis, flu and swine pox. In many instances these conditions interferred with the development of an immunity to cholera from vaccination.

On the following page are halftones of a number of those in attendance, their names and addresses being, left to right:

Top row: F. M. Wilson, Mechanicsville; R. B. Helming, Cresco; J. M. Wilson, Winfield; W. C. Vollstedt, Dixon; W. J. Pirie, Springfield; A. L. Smith, Denver; W. L. Andrews, Milton and S. G. Paul, Clarence.

Second row: H. I. McCulloch, New Sharon; L. M. Darst, Princeton, Ill.; W. S. O'Brien, Ryan; D. N. Voetberg, Trear; I. W. Moranville, Durant; A. H. Davidson, Independence; E. A. Buston, Vinton and C. L. Gamrath, Fairfield.

Third row: C. B. Oldaker, Kalona; J. H. Odgers, DeWitt; F. R. Ahlers, LaMotte; P. V. Neuzil, Blairstown; N. A. Kippen, Independence; C. A. Stewart, Tripoli; J. Weininger, Des Moines, and W. C. Stewart, Maquoketa.

Fourth row: F. J. Crow, Iowa City; C. H. Banks Tipton; J. C. Glenn, Norway; G. R. Fowler, Ames; J. W. Pirie, Cedar Rapids; Mr. W. H. Swartzendruber, Wellman; Henry Hell, Wilton Junction, and J. A. Barger, Des Moines.

Firth row: J. W. Griffiths, Cedar Rapids; E. R. Frank, Manhattan, Kan.; C. E. Hunt, Mount Pleasant; Mr. S. W. Simmons, Ames; J. B. Bryant, Mount Vernon; E. R. Kennedy Moline, Ill.; Frank Walsh, Ames, and H. E. Biester, Ames.

Sixth row: J. H. Spence, Clinton; R. M. Hofferd, Cedar Rapids; E. F. Stewart, Cedar Rapids; H. A. Seidell, Des Moines; J. H. McLeod, Charles City; C. J. Scott, Knoxville; J. J. Strandberg, Belle Plaine and Mr. Jos. F. Ryan, Pitman-Moore Company, Cedar Rapids.

Seventh row: J. I. Gibson, Jensen-Salsbery Laboratories, Des Moines; Mr. G. H. Williams, Corn States Serum Company, Omaha, Nebr.; J. H. Copenhaver, Liberty Laboratories, Omaha, Nebr.; A. T. Kinsley, Kinsley Laboratories, Kansas City Mo.; Frank Breed, Norden Laboratories, Lincoln, Nebr.; P. S. Casey, Vitamineral Products Company, Peoria, Ill.; Lew. McElyea, Ames Veterinary Supply Company, Ames, and R. T. White, Corn States Serum Company, Cedar Rapids.

Eighth row: John Patterson, Patterson-Harwood Laboratories, Des Moines; S. S. Huston, Norden Laboratories, Davenport; J. D. Ray, Corn States Serum Company, Omaha, Nebr.; Mr. David Gould, Veterinary Medicine, Chicago, Ill.; T. W. Munce, Allied Laboratories, Sioux City; C. W. McLaughlin, Allied Laboratories, Melvin, Ill.; Glenn Grogan, Vitamineral Products Co., Aurora, Ill.; and G. B. Munger, Allied Laboratories, Cedar Rapids.

Fortieth Annual Meeting, United States Live Stock Sanitary Association

The attendance at this important meeting was large, including official representatives from nearly all the states. At no meeting of this organization in recent years has the attendance been so large. Perhaps not since 1920 have so many states been represented by their live stock sanitary authorities.

Dr. Walter Wisnicky, Madison, Wis., Pres., U.S.L.S.S.A., 1935-36.

The program was up to the usual high standard. Brief abstracts of the more important papers follow.

Address of the President[1]

A brief survey in the field of animal disease control reveals that no destructive epizootic occurred in our country during the past year. One of the new problems brought to the surface in the turmoil of progress is the relationship of the livestock producer to the system of veterinary science. The livestock grower today wants basic information on every problem that has direct or indirect relationship to his business. Our system of veterinary medicine should be vitally concerned with rendering the livestock industry the most efficient, practical and scientific veterinary service. There is evidence at every hand of the hunger for information on animal disease problems, information not necessarily of the "be your own veterinarian" type, but information that would enable him to appreciate the necessity for skilled and trained veterinary service when occasion demands it. With existing manifestations for that type of veterinary knowledge, the opportunity is seized upon by various interests, not primarily with the intent of giving the livestock producer the veterinary information which will serve his best purpose, but with a design to use his desire for veterinary knowledge to further their own interests. Those selling various veterinary remedies, minerals, and livestock feeds directly to the livestock owners, seize upon this hunger for veterinary knowledge by offering to the livestock industry their wares on the vehicle of veterinary information. After the sale of their commodity is made they lose interest.

Other attempts to convey veterinary information to the livestock owner came through the so-called "breeding schools," courses of one or two weeks' duration. It is obvious that a subject of such a wide scope cannot be mastered by even the brightest mind in such a short period. In the poultry-disease field we have another kind of rapid-fire educational system, combined with the sale of various poultry remedies, which pretends to train hatcherymen and poutrymen as "poultry technicians" in the brief course of one or two weeks. During this short period, candidates not even possessing a high school education are "thoroughly versed" in the fields of pathology, bacteriology, microbiology, pharmacology, and other sciences. This short period is insufficient to bring about a comprehensive understanding of the meaning of the names of the various sciences which a pretense is made of teaching. These men go out and pretend to render a form of veterinary service to the poultry industry. The sole objective is to sell remedies and equipment. The school certificate and the veterinary information mailed as printed matter are merely an *entrée* for the sale of poultry remedies. The remedies are sold to flock owners, irrespective of whether or not they apply to the existing disease.

Some livestock and agricultural journals also take a hand at attempting to supply, in the form of supplements or through veterinary columns, information of a tech-

[1] By Walter Wisnicky, State Veterinarian, Madison, Wis.

nical veterinary nature. This effort, likewise, falls short of meeting the needs for information on veterinary subjects for which the livestock producer is eager. Finally, mention must be made of the demands being made upon the county agricutural agents and farm advisors for veterinary information. Again, it is not necessarily veterinary information of the "be your own veterinarian" type, but rather for the basic and practical information which would enable the livestock producer to help himself by using sanitary and preventive methods, information that would enable him to employ technical veterinary help in an intelligent and productive way.

This demand from livestock producers for veterinary information must be met through the established and legitimate veterinary agencies now existing. It is probably easier to recognize the existing needs than to formulate a proper plan to take care of them. It is evident that the patent remedy interests, the mineral and feed salesmen, the two-week graduates of non-recognized so-called breeding and poultry-disease schools, the farm press veterinary column, and the county agricultural agent system are not adapted to meeting the problem at hand.

Another problem which is of extraordinary importance to the livestock producing industry is the unification of laws, regulations, policies and methods pertaining to milk and meat hygiene and animal health requirements on livestock moving interstate. The old regulations needed when bovine tuberculosis was prevalent are now obsolete by virtue of the progress made in the control of this disease. However, as yet no change has been made in the laws and regulations. Outdated and unnecessary regulations are also in existence in the form of requirements on cattle moving interstate. If an unreasonable attitude is shown in the form of maintaining outdated, expensive regulations and requirements, it will be difficult to get sincere and wholehearted co-operation from livestock producers and shippers when an effort is made for the observance of absolutely necessary and reasonable regulations.

Another problem that should be mentioned briefly is that pertaining to the acute shortage of graduate veterinarians. No recommendations are made in regard to this problem.

Report on Developments in Bang's Disease Work[2]

Dr. A. E. Wight, Chief of the Tuberculosis Eradication Division of the Federal Bureau of Animal Industry, stated that substantial progress had been made. At the end of October, 1935, there were about 536,000 herds, containing approximately 6,450,000 cattle, under supervision in the Bang's disease program, which is an increase of approximately 100% in the number of herds and 70% in the number of cattle under supervision as compared wth October, 1935.

Dr. A. E. Wight, Washington, D. C.

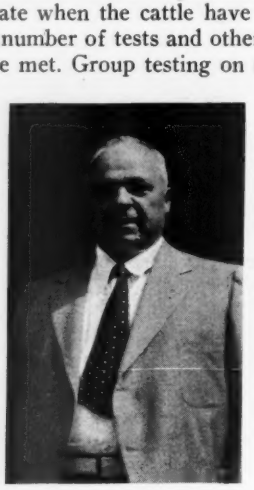
Agglutination blood tests were applied to about 6,600,000 cattle, contained in 422,266 herds, during the fiscal year ended June 30, 1936. A considerable number of these, however, were retests. These tests disclosed about 450,000 reactors, or, 7%. A larger number of tests for Bank's disease was made in October, 1936, than in any previous month. He reported 731,656 cattle were tested during that month, disclosing 39,687 reactors.

Of the special Federal appropriation for cattle disease work, $14,214,000 was made available for the Bang's disease program during the fiscal year ending June 30, 1937. In Maine, New Hampshire, Rhode Island, and Virginia, the owners of cattle that react to the test for Bang's disease receive a state payment in addition to the Federal payment. During the last fiscal year the average appraisal of reactors was $70.65, the average salvage $27.43, and the average Federal payment $26.89. About 11% of the reactors were registered purebred animals.

In about three-fourths of the states, the

[2] By A. E. Wight, Chief, Tuberculosis Eradication Division, Bureau of Animal Industry, Washington, D. C.

owners of herd under supervision receive a certificate when the cattle have passed a specified number of tests and other requirements are met. Group testing on a county-



Dr. A. F. Schalk, Columbus, O.

wide basis is being conducted in several states. The results of the work show that, on the initial test, throughout the United States the average infection in herds thus far tested 14 or 15%.

Dr. Wight reported that some experimental work was being conducted in the field in connection with further studies of calfhood vaccination, but, as yet, it is too early to appraise the results of such vaccination.

Progress made in the elimination of cattle reacting to the test for Bang's disease has been given considerable publicity during the past year through the press and radio, and this has been most helpful to the program. Preparation has been made to continue the work until June 30, 1937, but future work will depend upon congressional action. He indicated that work on an area basis should not be undertaken until the sentiment of cattle owners is favorable to it.

Information regarding the amount of work done in each state during the 28 months the campaign has been in operation, and a map showing the approximate percentage of cattle under supervision in the various states, were distributed at the meeting.

Area Work in Bang's Disease Control[3]

Ten years ago, in compliance with a request of cattle breeders in Virginia, definite measures were taken to eradicate Bang's disease from their cattle. The Virginia law declares Bang's disease to be a contagious disease of live stock; it provides for the establishment and enforcement of quarantine; for the compulsory testing of cattle; the compulsory slaughter of those that react to the agglutination test; the compulsory reporting of tests made in the state; for the adoption and enforcement of regulations by the state board of agriculture; for the co-operation by counties in the state, and it fixes punishment and penalties for violation of the law. The testing of all cattle in counties has, in every case, revealed that Bang's disease infection was less than estimates based on herd testing. The testing of all cattle in counties, followed by the slaughter of positive animals, cleaning and disinfecting premises, and retesting for infected herds, has shown, conclusively, that Bang's disease infection can be reduced and eradicated by this method, and that the agglutination test for Bang's disease is dependable for practical purposes. Testing large numbers of cattle under the area plan has proved that cattle tested under varied circumstances in areas where Bang's disease infection does not exist will not react to the test, while in infected areas they will react with regularity. The result of the test on several thousand cattle in counties where no history or clinical evidence of Bang's disease existed, was less than 0.5% positive reactions on the original test. Cattle owners cannot hope to escape losses entirely, and at the same time get rid of a disease as serious as Bang's disease. Additional losses that cattle owners should be willing to accept at this time are the occasional animals that abort and fail to react.

Testing of all cattle in Virginia counties under the area plan has proved that this method is highly efficient in preventing the further spread of Bang's disease. In untested counties additional herds continue

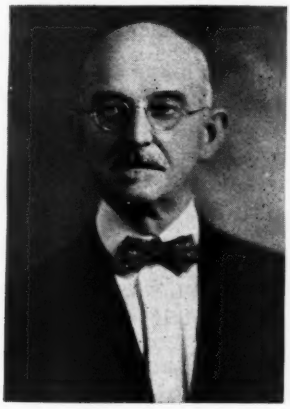
[3] By H. C. Givens, State Veterinarian, Richmond, Va.

to become infected. The testing of all cattle definitely locates all centers of infection in the area and makes it possible to prevent the spread of the disease from otherwise unknown sources into herds that are not infected.

In supplying replacement animals, for herds that have been reduced for the sake

Dr. E. T. Faulder,
State Veterinarian, Albany, New York.

of Bang's disease eradication, the area plan of testing cannot be surpassed since clean replacements are quickly and economically available within the area. The *Brucella abortus* infection in animals other than cattle has proved no barrier to the eradication of Bang's disease from the cattle in the area. Testing cattle under the area plan showed that many unsuspected small lots of cattle, and single animals, are infected with Bang's disease. Our experience indicates that assembled cattle shipped from other states into a Bang's disease-free area, on a single test in the state of origin, are not satisfactory as replacement animals. The present single test for Bang's disease on assembled cattle for interstate shipment is inadequate, and measures should be taken in all states to discontinue the testing of assembled cattle for interstate shipment or for herd replacements. Entire herds of cattle should be tested and in the case of herds showing infection none of the animals should be accepted for replacements in clean herds. Experience indicates that it is necessary to retest infected herds at intervals of 30 days or less to control, effectively or eradicate the disease from them. The spread of Bang's disease is much faster than of bovine tuberculosis. It has been found necessary to place a sufficient



Dr. T. A. Sigler, Greencastle, Ind.

number of veterinarians in an area, when testing is started, to collect blood samples rapidly enough to prevent overlooking animals on account of movement that may take place in the area.

The cost of testing has not been found prohibitive. The dilutions used are 1:50 and 1:100. All animals reacting positive to dilutions of 1:100 are condemned, and those reacting to dilutions of 1:50 are suspected. If the percentage of infection in the area is equal to or greater than 1%, all cattle in the area are retested beginning six months from the date the original test of the area was started, after which all infected herds are again followed out. The procedure has been to test all male and female cattle, six months of age or over, and to remove the reactors; clean and disinfect the premises, and retest all infected herds at 30 to 60-day intervals until they pass two negative tests. By this method the disease has been reduced in a satisfactory manner. Bang's disease infection varied on the original county-wide test of all dairy and breeding cattle in 36 Virginia counties from a maximum of 5.1% to a minimum of 0.25%. In thirteen of these counties a retest was conducted on all cattle which showed the average infection in the cattle

in these counties to be approximately 0.5%. In Virginia it is felt that this method is the solution of the Bang's problem and that the program should be continued.

Fowl-pox Vaccination of Day-old and Older Chicks[4]

Vaccination of day-old chicks resulted in a systemic reaction which caused a temporary inhibition of growth and lowered vitality for variable periods. During the period of lowered vitality, exposure to unfavorable environment or concurrent disease, as occurred in certain instances, resulted in excessive mortality. A similar systemic reaction followed vaccination between the ages of 13 and 42 days, but it was progressively less severe as the age at time of vaccination increased. The birds vaccinated at the ages of from 75 to 117 days also showed a definite inhibition in growth, despite the fact that they comprised selected vigorous birds and their environment was beyond criticism. The mortality in all groups was nominal. Just what the vaccination of the groups would have been had they included the less vigorous birds as well as the selected is problematic.

Dr. C. P. Fitch, St. Paul, Minn.

A later development of unusual interest among those vaccinated as chicks is that the survivors began laying earlier and since production has started, the mortality has been less than half that of the non-vaccinated controls. This suggests that the effects of early-age vaccination may have removed from the flock the weaker birds which would not have survived long enough after attaining laying age to make them profitable to the owner.

[4] By R. E. Lubbenhusen and J. R. Beach, Division of Veterinary Science, University of California, Berkeley, Calif.

Experiments with Crystal Violet Hog Cholera Vaccine[5]

Through the liberality of the Bureau of Animal Industry, information concerning the manufacture of the crystal violet vaccine was supplied to commercial firms and other interested institutions. As a result of this generosity Munce was privileged to make a brief study of the vaccine.

The administration of the vaccine is followed by leucopenia. This condition may or may not be of sufficient degree and duration to invite post-vaccination infection. Immunity tests of 118 vaccine-treated pigs, 21 to 201 days following the administration of the vaccine, resulted in 21 deaths, 17 severe reactions, and five mild reactions. Seventy-five pigs, or 63.5% of those tested remained well. A surprisingly strong immunity was demonstrated by pigs which had received the vaccine 91 to 201 days prior to the administration of large doses of virus.

The simultaneous administration of large doses of anti-hog cholera serum with crystal violet vaccine apparently interfered with the degree of active immunity stimulated by the vaccine. The degree of immunity stimulated by subcutaneous and by intramuscular injections of vaccine was approximately equal. Other considerations seem to advise against its use intra-muscularly. The results of these experiments did not clearly indicate superior immunizing efficiency on the part of 10cc doses of the vaccine as compared with that of 5cc doses. Conclusions regarding dosage should not be drawn, however, until a large number of experimental results are available for study. Certain improvements in the physical and chemical nature of the vaccine are desirable. Improvement in production procedures is desirable also in order to prevent excessive growth of contaminating organisms during incubation of the vaccine. The attenuation of the vaccine by holding at a temperature of 37.5° C. for 14 days may or may not require some modification.

[5] By T. W. Munce, Allied Laboratories, Inc., Sioux City, Iowa.

Swine Pox[6]

A skin disease of swine, recently observed on routine examination of swine in Iowa, was made the subject of investigation by Chas. Murray.

The disease starts with slightly elevated, reddish, congested areas on the skin, 0.5 to 1cc in diameter. Soon, the surface changes to a lighter color of semi-transparent appearance, due to the formation of tiny vesicles. As the disease progresses, the central area of the elevated spot changes from its vesicular appearance to a grey area, later becoming dark-brown, shrunken and scab-like. With the subsidence of inflammation the lesions begin to dry up, become harder and stand out above the general level of the skin until they fall off as scabs.

Dr. H. C. Rinehart, State Veterinarian, Springfield, Ill.

The microscopical examination of the lesions revealed swelling of the prickle cells, followed by vacuolar degeneration. Leucocytic infiltration is observed during later stages. Healing takes place with growth of epithelium from the margin of the lesion, and subsequent cornification of the surface of the new epithelium.

The eruptive processes were commonest along the belly and on the inner surface of the legs. In pigs with extensive lesions the spread was over the sides and sometimes along the back on face and ears.

The disease was transmissible to pigs by artificial inoculation and by exposure. Rabbits proved to be refractory to infection.

On the basis of the gross general character of the lesions, their development and healing as well as on the basis of the microscopical study, and the contagious nature, Murray considers this disease identical with swine-pox or swine variola occurring in Germany.

[6] By Charles Murray, Dean, Division of Veterinary Medicine, Iowa State College, Ames, Iowa.

Transmissible Diseases of Swine[7]

Hog cholera, enteritis and swine erysipelas continue to be the most important transmissible diseases of swine, ranking in importance in the order named. There was a marked decrease in the prevalence of these and other transmissible diseases of swine during the late summer and fall months, however, because of the large reduction in the number of hogs on farms in the corn belt states, as a result of the shortage of feed due to the severe drought which visited these states the past summer.

Dr. E. T. Hallman, East Lansing, Mich.

Dr. A. T. Kinsley, Kansas City, Mo.

The extensive drought reduced the number of swine and lowered the quality of the feed produced in the hog raising districts of the drought areas, rendering them deficient in certain of the important elements which have to do with maintaining the normal resistance of swine and other animals to infectious diseases. In recent weeks there has been an increase in the losses following vaccination against hog cholera which apparently can be attributed to no other cause than a lowered resistance due to some deficiency in the diet. These conditions will probably increase during the coming winter and spring months and may include infectious diseases affecting

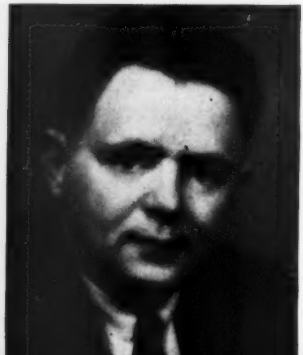
Drs. J. G. Hardenbergh, H. L. Darby and C. Way.

[7] By A. T. Kinsley, Kansas City, Mo., Chairman, Committee on Transmissible Diseases of Swine.

the breeding animals. The kind and quality of feed available should be considered in connection with the prevention and treatment of transmissible diseases of all swine in the drought areas.

Report on Parasitic Diseases[8]

The committee on Parasitic Diseases of Livestock reported substantial progress in the control of swine parasites, liver flukes of sheep and cattle and screw worms which affected all classes of domestic animals.



Dr. Benjamin Schwartz, Washington, D. C., Chief, Zoölogical Division, B. A. I.

THE control of swine parasites has centered primarily around the kidney worm, an economically important pest in the South. These parasites do considerable damage by invading the liver, lungs, loin muscles and other parts of the body, interfering with normal growth and development in cases of severe infestations, and injuring their hosts in other ways. Based on the life history of this parasite, ascertained by parasitologists in this country and abroad, workers in the U. S. Bureau of Animal Industry have devised effective and practical control measures, especially applicable to the South, where this parasite is prevalent. In an area where about 90% of the livers, kidneys and perirenal fat are infested, the incidence of infestation was sharply reduced by following the special set-up for kidney worm control. As a result of the reduced infestation the prices paid for these selected hogs averaged in some cases as much as one dollar more per 100 pounds of live weight than prevailing prices at the nearest market.

WITH the aid of emergency funds the Federal Bureau of Animal Industry conducted a campaign to control liver flukes in cattle and sheep in Washington, Oregon, Utah and Idaho. Drainage of wet and boggy pastures was found to be the most effective procedure. The chief advantage of drainage is that the benefits are permanent if the drainage ditches are properly constructed and are maintained so that there are no obstructions to the flow of water. Recently reclaimed boggy pastures contain thousands of dead snails which when alive were capable of harboring the development stages of liver flukes. The death of the snails breaks the vicious cycle of the fluke. Another important advantage of drainage is that the coarse aquatic grasses disappear and are replaced by clover, timothy, redtop and other nourishing forage crops.

SCREW WORM infestation appeared in domestic animals in Georgia and Florida in the summer of 1933. In 1934, 57 counties in Florida and 126 counties in Georgia were affected with nearly one million cases in these two states; livestock in Mississippi, Alabama and South Carolina were also affected by this pest. In some sections the mortality was very high, especially in sheep and hogs.

In 1935 the infestation was generally prevalent over the area affected in 1934. As a result of an appropriation of federal funds, an educational program was undertaken by the Federal Bureau of Entomology and Plant Quarantine. Meetings, demonstrations and visits to individual stockmen coupled with instruction on control methods, prevented the 1935 outbreak from reaching alarming proportions. An additional appropriation for screw worm con-

[8] By Benjamin Schwartz, Washington, D. C., Chairman, Committee on Parasitic Diseases.

trol in 1936 and the continuation of the educational program resulted in a further reduction of screw worm cases.

Available evidence indicates that the screw worm fly overwinters as far north as the southern counties of Georgia, throughout most of Florida, in the southwestern part of Texas.

THE common housefly is an important agent in the transmission of tapeworms to poultry. Tests have shown that chickens exposed to flies acquired sizeable infestations with this parasite.

STUDIES on the common intestinal nematode of fowls, *Ascaridia lineata*, have shown that there is a variation in resistance to this worm among different breeds, that age is a factor in resistance and that there exists a variation in resistance among different strains within a breed. The offspring of a selected group of white leghorns were more resistant to this parasite than those of another flock of the same breed. In close matings of the resistant strain the birds of the second generation retained their relative insusceptibility to the fowl nematode.

Status of TB Eradication Project[9]

Dr. A. E. Wight, Chief of the Tuberculosis Eradication Division of the Federal Bureau of Animal Industry, reported decreases in the extent of tuberculosis in both cattle and swine. During the past year he stated that it was possible to conduct a large amount of work in the tuberculosis eradication project because of the additional Federal funds made available during that period. These funds were used both for operating expenses and indemnity. In some states very little tuberculosis was found among the cattle tested, while in others the degree of infection was quite high. Many additional counties were placed in the modified accredited area during the past year.

The number of accredited herds of cattle on October 1, 1936, was about the same as reported for the past three years. There are now about 256,000 such herds in the United States, containing about 3,750,000 cattle. During the fiscal year ended June 30, 1936, tuberculin tests were applied to about 23,000,000 cattle, and about 165,000 reactors were disclosed, showing that the incidence of tuberculosis was about one-half of what it was during the previous fiscal year.

On December 1, 1935, Iowa and Montana were added to the modified accredited area, and since that time Delaware, Mississippi, Oklahoma, Arizona, Texas, Connecticut, Nebraska, Rhode Island, Vermont and Pennsylvania have been added in the order named, making an increase of 12 states since December 1, 1935.

There are now three states in the eastern part of the country and two in the western part in which not all the counties are in the modified accredited area. But indications are that all of the counties in the three states in the eastern part of the country will be added to the modified accredited area by July 1, 1937. In California and South Dakota, the two states in the western part of the country not yet entirely in the modified accredited area, some delay has been encountered due to the lack of necessary legislation and available funds, as well as some organized opposition on the part of the cattle owners.

Dr. C. N. McBryde, B. A. I. Experiment Station, Ames, Iowa.

On September 1, 1936, Regulation 7 of B. A. I. Order 309, which concerns the interstate movement of cattle as far as tuberculosis is concerned, was changed to some extent. The effect of this change is to reduce the Federal restrictions on the interstate movement of cattle originating in modified accredited areas, and to place ad-

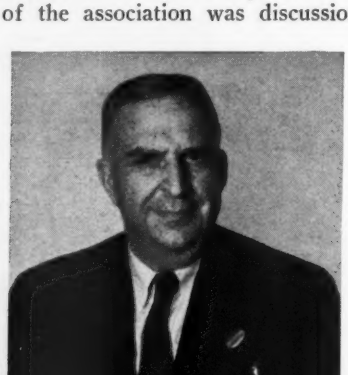
[9] By A. E. Wight, Chief, Tuberculosis Eradication Division, Bureau of Animal Industry, Washington, D. C.

ditional restrictions on cattle moving from sections of the country not in the modified accredited area.

Dr. Wight brought out the fact that considerable publicity has been given to the tuberculosis eradication work by the press throughout the country, which has been very helpful to the progress of the work. Similar information, he stated, was also given publicity over the radio at various times and places throughout the year. More detailed information regarding the progress of various features of the work was made available by means of a pamphlet containing considerable statistical material, which was distributed at the meeting.

Reaccreditation of Range and Semi-Range, Modified-Accredited, Tuberculosis-Free Area[10]

In this writers opinion, the most important discussion at this or any recent meeting of the association was discussion of



Dr. W. J. Butler.

the need for the collection of statistics of animal disease by W. J. Butler, State Veterinarian of Montana. Doctor Butler has not only a long record of successful livestock disease control, but a long record of service in the U. S. Live Stock Sanitary Association, without ever having been on the wrong side of any question of animal disease control. His views have not always been approved by the association when first promulgated, but in the end, somtimes only after a number of years, they have prevailed, been adopted and acknowledged to be sound.

Seventeen years ago the writer, then secretary of the association, presented the following recommendations to the association:

> There should be in this country some central agency for the collection and prompt publication of statistical matter having to do with live stock sanitation. The Bureau of Animal Industry's reports of the progress in tick eradication, and on the accredited herd plan and on meat and serum inspection offer data on isolated and detached problems of disease control but a service vastly more comprehensive is greatly needed, a general statistical service that will furnish a constantly available gauge of the disease situation throughout the whole country. The movement for such a service should be started at once by this association. This service might be best established within the Bureau of Animal Industry, but there appear to the writer many advantages in having it entirely unofficial and an enterprise of this association.

The following year (1920) the secretary's report contained the following:

> During the year, I have been impressed more than ever with the need of a central agency for the collection of animal mortality and morbidity statistics and I desire to repeat the recommendations of last year that this association take steps looking toward the establishment of such an agency either within the association or elsewhere. An editorial in the current issue of VETERINARY MEDICINE gives in some detail the reasons why such a statistical service is needed and I will not repeat them here.

The proposition was rejected by the executive committee of the association on the ground that livestock raisers in any given state would object to the publication of facts concerning the existence of animal disease in that state. The Federal Bureau of Animal Industry apparently still holds that view. We think that view is wrong. We have come a long way toward disease reporting in 17 years. Complete statistics of the prevalence of bovine, porcine and avian tuberculosis have been widely published; statistics concerning Bang's disease and mastitis in cows have been widely disseminated recently and for restricted areas,

[10] By W. J. Butler, State Veterinarian, Helena, Mont.

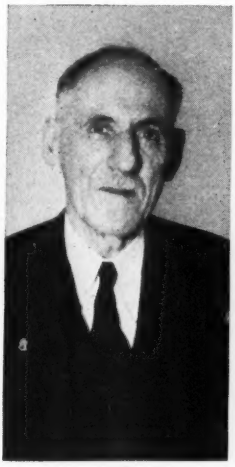
animal disease statistics far more comprehensive are now available. There have been no objections to any of these reports on the part of the livestock industry. In general, livestock raisers know we shall never do very much about the control of any disease of livestock until we know where it is, how much of it there is, how it got there and how it is extending. Measures for the control of animal disease not based upon a knowledge of even its location, or prevalence, cannot be taken seriously by any one. The association as a whole recognizes that, but must depend upon the actions of its members as individuals and officials to supply the needed information for even planning a disease control program.

In Illinois a beginning has been made in the collection of statistics of livestock disease. The data are being collected by the State Department of Agriculture by means of monthly reports from the licensed veterinary practitioners. It is reported a similar plan will be inaugurated by the Extension Service in co-operation with the veterinary practitioners in another state early in the new year.

Addressing himself to the subject of his discussion, Doctor Butler stated that our present methods of reaccrediting tuberculosis free areas are primarily designed to clear up old foci of infection, and not to pick out new areas of infection, and that our immediate problem is to pick out new areas of infection if and when they occur, without adding to the cost of the live stock grower and without an unnecessary drain on public funds.

He believes that reports of postmortem inspection offers the solution of this problem. Twenty per cent of the range cattle are slaughtered each year in abattoirs having Federal inspection and if the live stock sanitary authorities of the state of origin are notified when tuberculosis is found among any of the slaughtered animals of the state, they will be able in this way to locate new centers of infection. This, in conjunction with the tuberculin test of the old dairy and breeding animals, will effect an adequate means of holding in check possibly completely eliminating even so insidious a disease as tuberculosis in cattle.

At the present time, the live stock sanitary authority of Montana is supplied with a postmortem report on Montana cattle slaughtered at any of the western packing



Dr. W. E. Cotton, Experiment Center, Beltsville, Md.

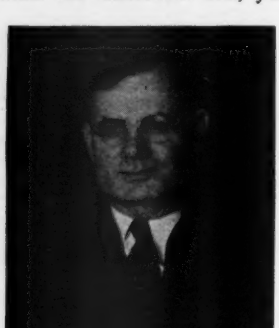
Dr. Wm. Moore, State Veterinarian, Raleigh, N. C.

houses and this service has been of inestimable value to the livestock industry of the state in locating disease centers, not only of tuberculosis but of other diseases as well. Such reports, however, are not furnished from the inspection force at river markets. The speaker sees no insurmountable difficulties to making such reports and believes that the system can be carried out. To quote:

> We do not advocate for one moment the discontinuance of the tuberculin test. The tuberculin test is and will continue to be the method used to disclose the number of infected animals in any infected herd, and must also be used in the constant testing of dairy cattle and old breeding cattle. What we do contend, however, is that it is a waste of energy and a costly work, both to the state and to the stock grower, to subject range cattle to repeated tuberculin tests unless infection is known to exist in the herd. If we let herds go without testing or without checking in some way to determine whether or not new foci of infection have sprung up, we may regret such a policy. In so far as range and semi-range cattle are concerned we can through postmortem inspection, determine very effectively whether or not new foci of infection have devloped. Herds found to be infected through postmortem inspection must be

immediately placed in quarantine and the entire herd subjected to a tuberculin test and the herd must pass two negative tests before being released from quarantine. In other words, the same regulations that pertain to herds of cattle found tuberculous by the tuberculin test must apply to herds found through postmortem inspection to contain tuberculosis infection.

The speaker went on to discuss the great value of postmortem reports in locating all chronic diseases of farm animals, stating that its value is such that it might well justify the inspection of all animals slaughtered for sale, and that the Federal government would be justified in contributing to the states part of the cost of the inspection of meat for intrastate use, just as they contributed a part of the cost of building public roads. "We are missing one of the greatest opportunities ever presented to the veterinary profession, and that is to create a system of locating disease centers, through postmortem inspection and to establish a uniform system of meat inspection throughout the United States that will be of inestimable value to the live stock industry and tend to stabilize the veterinary profession." . . . "The people of the United States are entitled to an adequate meat inspection system not only for meats that are shipped interstate, but for meats that are consumed within the borders of the states where produced." . . . "One of the greatest rackets we have today in the meat industry in many sections of the country, is the pawning off of inferior cow meat for prime steer meat, and it is the consumer who pays the bill."



Dr. R. R. Birch, N. Y. State Vet. College, Ithaca, New York.

Doctor Butler stated also that we must depend upon the veterinary practitioner for the location of acute animal disease.

Problems and Policies in Completing Tuberculosis Eradication[11]

The number of tuberculous cattle in this country trebled in the eight years from 1908 to 1916. In that latter year the number of cattle and hogs condemned, under B.A.I. inspection, as inedible on account of this disease would have loaded a freight train 21 miles long. Since 1916, 3½ million reacting breeding and dairy cattle have been removed from the herds of the United States by the tuberculin test. During the fiscal year 1936 the number of all cattle and hogs condemned on account of tuberculosis represented a trainload only three miles long. In Chicago alone, the number of cattle and hogs condemned as inedible on account of tuberculosis represented a trainload ten miles long in 1916; whereas during the past fiscal year the number of all cattle and hogs condemned for the same reason represented a trainload only two-fifths of a mile long.

Prof. H. R. Smith, Live Stock Commissioner, Chicago, Illinois.

One of the great lessons in these statistics is the efficacy of the tuberculin test. It finds the cattle that have this disease even in the most incipient stage. The elimination of tuberculosis in cattle has consistently lowered the incidence of this disease in man. Public health reports show a slight increase in the death rate from non-respiratory tuberculosis from 21 to 22 deaths per 100,000 population in 1916. Since the beginning of the federal and state cooperative cattle testing program in 1917, the human death rate from non-respiratory tuberculosis has declined to five per 100,000 population. From past experience it seems

[11] By H. R. Smith, Livestock Commissioner, National Live Stock Exchange, Chicago, Ill.

that if testing is continued, the entire nation may eventually be virtually free from bovine tuberculosis.

There is little probability that livestock owners will not continue to test for re-accreditation because our cities will refuse to accept milk or milk products from counties that lose the accredited state. When the entire nation is accredited we should have federal legislation to bar from this country the importation of milk and milk products originating in foreign countries containing bovine tuberculosis. As complete eradication nears its goal the necessity of testing all cattle each three-year period will become less. If there can be developed some accurate way to check on conditions without the work and expense of applying the tuberculin test to all cattle at relatively short intervals, it should be adopted.

The percentage of cattle condemned for tuberculosis in the United States is now only one-twelfth as great as two years ago; the percentage of hogs condemned is but one-fourth as large. The decline in hog condemnations is so much less that it must be concluded that a considerable number of hogs are condemned for the avian type of infection. The wide prevalence of this disease in poultry, particularly in the north central states constitutes a real problem. The loss to the poultry industry through reduced vitality and premature death is many times that on hogs from this disease. The work already done on poultry, particularly the educational program to persuade flock owners to keep only young birds has reduced the prevalence of this disease in certain communities as indicated by the lower percentage of hogs retained at markets which receive supplies from such areas. The fact that we do not have post-mortem inspection of poultry is in some measure responsible for the complacency of flock owners in the face of their avian tuberculosis problem. To cope with the tuberculosis problem in poultry, will require the best efforts of sanitary officials. The campaign against bovine tuberculosis has been so successfully waged, there is every reason to believe that some plan will be evolved to complete the job by eliminating this disease in poultry as well as in cattle to the great advantage of the poultry and swine industries.

The Epidemiology and Control of Equine Encephalomyelitis[12]

Since 1930 when Meyer and his associates first established a relationship between a certain type of equine encephalomyelitis and a filterable virus this condition has been the subject of much work and numerous publications. There still, however, appears to be considerable confusion in connection with most of the more practical aspects of this problem.

Epizootological studies have probably been hampered by the failure to realize that clinical cases of this disease are not an accurate index of the distribution of the virus. These clinical cases merely represent a variable but usually very small percentage of the horses infected, the majority merely developing a more or less solid immunity without any visible symptoms. Nothing definite is known as to how this virus is transmitted from horse to horse under natural conditions or disseminated from area to area. It is not even known with certainty whether secondary or intermediate hosts are involved or, in fact, whether or not the horse itself is a primary or secondary host.

This lack of definite epizootological knowledge would appear to make any efforts at control through police measures practically useless at this time. Some types of more direct control measures do offer considerable of value where economic conditions warrant them. The immunization of horses in advance of the season when clinical cases may ordinarily be expected appears feasible. The only objection to this procedure is the lack of any accurate method of predicting where clinical cases will occur to an economically significant extent in any given year.

It is claimed, and may later be definitely proved, that the use of the formalized

[12] By Edward Records, Department of Veterinary Science, University of Nevada, Reno, Nev.

brain vaccine now commercially available offers sufficient immunity to prevent the occurrence of clinical cases. Granting this, there are serious economic objections to its use on a large scale owing to the high cost of the material involved and the two handlings of the animals required for the repeated doses.

If the pre-season immunization of horses in a given area is decided on, the use of live virus, fixed or modified by repeated experimental animal passage so that it is nonpathogenic for the equidae but still highly antigenic, is worthy of serious consideration. This seems to be the most economical method of immunization so far available, as only one dose is required to produce a practically solid immunity and the cost of the material is very low.

When immunization is delayed until such time as clinical cases appear in an area, the use of the live modified virus alone is probably not indicated, as it requires about 15 days to establish satisfactory immunity, and susceptibility is probably increased during at least a part of this period. Under these conditions at least two other methods of procedure are available.

Prophylactic doses of hyperimmune serum alone may be used. This will confer an almost immediate and quite satisfactory immunity, but this immunity does not last for more than from 15 to 20 days. Where such a short period of protection is not deemed sufficient, which is usually the case, the simultaneous administration of the modified living virus and serum in properly adjusted doses may be resorted to. If the dosage of the serum and virus is properly correlated, the serum appears to afford its usual immediate protection without interfering with the establishment of a more solid and lasting immunity by the virus.

Any method of control involving the use of biologic products depends upon the degree of potency and standardization of these products for success. Such products can be prepared, but some further work is needed in developing more stable preparations of modified live virus for routine field use.

Experimental Vesicular Exanthema of Swine[13]

Vesicular exanthema of swine, an acute, infectious disease characterized by vesicles and erosions on the feet and snout and a high thermic reaction, has occurred yearly since 1933 among garbage-fed hogs in California. This disease in hogs simulates vesicular stomatitis and foot-and-mouth disease so closely that the three diseases can be differentiated only by animal inoculation.

The disease is reproduced in hogs experimentally by inoculating the virus on the scarified snout and the interdigital space of the feet. The scarified areas show slight inflammation and erythema, 20 to 28 hours later, and the temperature rises acutely from normal to 104° to 107° F., which is followed by the formation of vesicles on or near the scarified areas. The vesicles progress by extension over the snout and from the interdigital space of the foot upward around the coronary bands and the base of the dewclaws and downward to the bearing surface of the pad. In severe cases, secondary lesions occur on the tongue and on the uninoculated feet. The temperature drops gradually to normal with the rupture of the vesicles. The appetite is but slightly impaired. There have been no fatalities among the experimentally infected hogs.

Horses are susceptible to artificial inoculation only. The virus inoculated on the scarified tongue causes an elevation of the temperature between the 24th and 28th hours; this is followed by a thickening and uplifting of the scarified epithelium which gradually turns to a grayish color, becomes loosened and sloughs. The temperature drops to normal within a few hours after the loosening and sloughing of the affected epithelium. There is no extension of inflammation in the horse beyond the scarified area and no vesicle formation. The loosened epithelium carries the virus of the disease.

Four strains of virus (Types "A", "B", "C" and "D") from the 1933 and 1934

[13] By A. B. Crawford, National Agricultural Research Center, Bureau of Animal Industry, Beltsville, Md.

outbreaks were studied experimentally at the Experiment Station, Bureau of Animal Industry Experiment station at Bethesda, Maryland, and each proved to be a distinct type. Types "B" and "D" were found to be capable of producing the disease artificially only in swine, while types "A" and "C" were infectious for horses as well as swine. No other species of animals was found to be susceptible. The animals tested for susceptibility included cattle, goats, sheep, guinea pigs, white mice and hedgehogs. Hogs could be passed successively through each of the four types of vesicular exanthema but, on recovery, were immune thereafter to the homologous type; that is, a hog which had passed through the "A" type of infection was immune thereafter to "A" virus but could be infected with "B", "C" and "D" viruses.

Mr. Joe Mercer, Live Stock Commissioner, Topeka, Kansas.

The plurality of the viruses of vesicular exanthema is in accord with the plurality of the viruses of vesicular stomatitis and foot-and-mouth disease, witness the "Indiana" and "New Jersey" types of vesicular stomatitis and the "O", "A" and "C" types of foot-and-mouth disease, in which diseases the same conditions of susceptibility and immunity obtain with the respective types as in vesicular exanthema of swine.

The studies of vesicular exanthema, as a whole, indicate a closer relationship of this disease to vesicular stomatitis than to foot-and-mouth disease, but that the three diseases are separate and distinct.

Left: Dr. T. H. Ferguson, Lake Geneva, Wis. Right: Dr. J. V. Lacroix, Evanston, Ill.

Needs of National and State Unity in Sanitary Control of Dairy Products[14]

The development of the sanitary control of dairy products in the United States has led to the adoption of a wide variety of regulations. Many of these regulations are conflicting and lead to confusion in the minds of dairymen. It is especially confusing when the state, county, city and dairy each has its regulations and corps of inspectors. In many cases the dairyman does not know which has supreme authority and inspection to him is a thing to be endured and rather humorous.

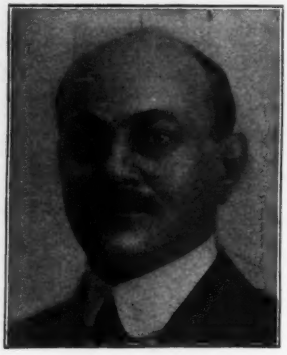
Dr. I. A. Merchant.

There is lack of uniformity in the United States in the group having control of the milk supply. In a survey of the various states it was found that State Boards of Health controlled sanitation in 24 states, Departments of Agriculture in 16, Dairy Commissions in seven, and State Veterinarians in three. Some states had control divided among two or more groups. The attitude of each of these groups is different in regard to the sanitary requirements for the production, handling and processing of dairy products. Each group may vary in strict enforcement of regulations.

[14] By I. A. Merchant, Associate Professor Veterinary Hygiene, Division of Veterinary Medicine, Iowa State College, Ames, Iowa.

The same situation is observed in the various cities. The control is generally located in the Department of Health, but a wide variety of individuals are hired to do the inspecting. Some with adequate training, others with a scanty knowledge of sanitation and others with no knowledge at all. This would lead to a lack of uniformity under any supervision.

Live stock sanitary officials have contributed a great deal to uniformity in animal health measures. At least the tuberculin test and Bang's disease test are uniform although there may be variances in interpretation. Uniform regulations govern the transportation of infected animals intra-state. There is uniformity of opinion in the veterinary profession as to what constitutes a healthy cow. Upon this basis, and it is the real basis of sanitation in milk production, a structure may be built which will lead to state and national uniformity.



Dr. A. Eichhorn, Lederle Laboratories, Pearl River, N. Y.

The United States Public Health Service has contributed a great deal to uniformity by compiling the information contained in the Public Health Service Milk Ordinance. Its adoption tends to uniformity. There is a need, however, of a less detailed type of state code which each state might adopt.

Whether one may hope for uniformity in a nation of "rugged individuals" is a moot question. Perhaps progress is due to the fact that we do not all come from the same mold. Let us hope, however, that some of the duplication of inspection and confusion in regulations may be eliminated for the sake of a better and safer milk supply.

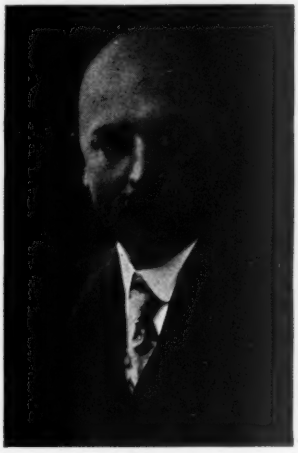
Report on Transmissible Diseases of Poultry[15]

The problem of poultry disease control offers the most promising field for the application of modern sanitary methods of prevention. Unfortunately, no other group of animal husbandmen is more viciously bombarded with proprietary agents of all descriptions than the poultry producer. The committee on proprietary pharmaceuticals of the American Veterinary Medical Association is performing a good service to the veterinary profession and to animal industry through its effort to combat nostrums and misbranding, and by its eager cooperation with the Food and Drug Administration. A review of the Food and Drug Administration's activities reveals that its intensive drive against the scores of so-called "cures" for pullorum disease has been highly instrumental in eliminating these from the market. During the past three or four years some 60 cases of misbranding of so-called poultry disease preventives and cures were brought to trial and were adjudged violations of the Pure Food and Drug Act. The poultry diseases for which cures were claimed on the packages included limberneck, roup, cholera, gapes, bronchitis, worms, coccidiosis, diarrhea, enteritis and catarrh. The many still-existing worthless so-called "preventives" and "cures" and the high-powered salesmanship behind them constitute a serious menace to the poultry industry. Their harmfulness comes from instilling a feeling of false security in the poultry raiser and from drawing away attention from the things that should be done, namely the institution of sane measures of prevention. Thus, the most effective barriers against transmissible disease, which sanitary science has set up, will be lowered.

There appears no doubt that much good is accomplished by the use of laryngotracheitis and fowl pox vaccine, but there is much disagreement among poultry disease experts as to when such treatment should be given, and the criteria on which they

[15] By Leo F. Rettger, New Haven, Conn., Chairman, Committee on Transmissible Diseases of Poultry.

should be based. Irrespective of whether birds which have been treated with laryngotracheitis and fowl pox vaccine may become carriers, the mere handling and use



Chief John R. Mohler

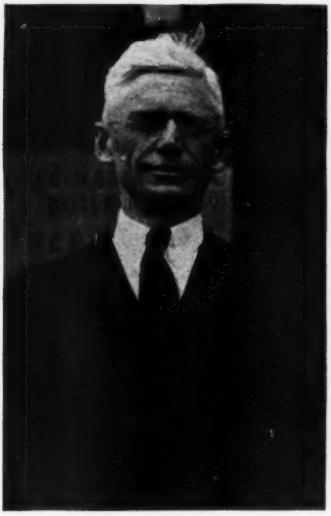
of the virus vaccines on poultry premises must constitute a hazard to hitherto uninfected flocks. Vaccination and serum treatment quite often have an important place in our armamentarium against disease, but they are only emergency measures which have as their ultimate aim eradication of the disease in question. In any well regulated program of transmissible poultry disease eradication, our main effort must be directed against the specific infectious agent, and the surest way of doing this is to devise and adopt methods of recognizing this agent and ridding the flock of it by eliminating birds from the flock which carry the disease organism either actively or passively. Proper cleaning of houses, yards, feed and water containers, and the liberal use of efficient disinfectants are important adjuncts.

An enormous amount of research has been conducted in recent years on nutritional disturbances in poultry, especially avitaminosis in which specific infectious agents apparently play no part. Furthermore, infectious diseases may have their inception and course determined to a large extent by faulty or inadequate nutrition.

Michigan Short Course for Veterinarians

In announcing the 14th annual Post Graduate Short Course for Veterinarians (VETERINARY MEDICINE for November, page IX) to be held at the Michigan State College, January 25-29, 1937, Dean Ward Giltner said:

"Our undertaking this year is unusual in that we are making an international ap-



Dr. Ward Giltner,
Michigan State College, East Lansing, Mich.

peal. We want to attract the veterinarians of United States and Canada who are interested in the three subjects: (1) The preparation and standardization of the antigen and the agglutination test for Bang's disease by the rapid plate method; (2) the vaccination against Bang's disease by the use of an avirulent culture, and (3) the preparation and standardization of antigen and the agglutination test for pullorum disease by the whole blood rapid plate test.

"We are anxious to have representatives of the commercial houses attend and participate in the program, bringing their commercial problems with them. We hope that all veterinarians engaged in laboratory or field work with the rapid antigens will attend the meeting and participate. It is especially desirable that all veterinarians interested in a program of Bang's disease

eradication attend this meeting in order that plans may be formulated relative to the use of a safe and effective immunizing agent as an adjunct to the stamping out method."

Tick Eradication in 1936[16]

The systematic drive to eliminate the cattle fever tick from infested areas in the United States was continued throughout the year, the net results for the season's work freeing an area of 28,150 square miles, located in Florida, Louisiana, and Texas. This releases from Federal quarantine two counties in Florida, (De Soto and Seminole); eight counties and two parts of counties in Texas; and 22 parishes and parts of two parishes in Louisiana, or all of the area that remained in quarantine in that State. The quarantine in four counties and two parts of counties in Florida; 24 counties and parts of four counties in Texas; and the Territory of Puerto Rico is continued quarantine.

During the year tick eradication in Florida, Louisiana, and Texas, continued to receive assistance by the allotment of funds made under the Emergency Relief Appropriation Act, and it was largely due to this assistance that Louisiana was able to conduct a systematic eradication campaign in all of the remaining quarantined area in that state.

Reinfestations in the released area were not as numerous this season as a year ago. Those reported were found mostly in states adjacent to quarantined area, namely, Arkansas, Louisiana, Mississippi, and Texas. Georgia, in which reinfestation occurred a year ago, has again succeeded in joining the 100% tick free column.

New Officers

The officers for the ensuing year are: Pres., Dr. R. W. Smith, State Veterinarian, Concord, N. H.; first vice-pres., Dr. D. E. Westmoreland, State Veterinarian, Frankfort, Ky.; second vice-president, Dr. J. L. Axby, State Veterinarian, Indianapolis, and third vice-president, Dr. H. D. Port, State Veterinarian, Cheyenne, Wyo. Dr. L. Enos Day was reappointed secretary-treasurer.

[16] By T. O. Booth, Fort Worth, Texas, Chairman, Committee on Tick Eradication.

WHAT'S WHAT IN VITAMINS

Everyone is keenly aware that vitamins are important in animal production and veterinary medicine and also that ignorance about them is an outstanding obstacle to their scientific utilization. What some of them actually are, what each alone or combined represent in the diet, what the upper and lower limit of tolerance and need really is, and what the synthetic substitutes promise to hygiene and medicine are so many questions to be answered before vitamin concentrates, derivatives and syntheses take their place unchallenged in the medicine chest and ration to replace the hidden vitamins consumed in the natural course of events. "Vitaminology" is a new science pleading its case at the door of pharmacology with a good prospect of qualifying for a seat in the front row, but its examination for admission remains incomplete. There are imperfections, exaggerations and misrepresentation to delete from its application for the exalted position it seeks. Since these have brought confusion and suspicion to the mind of the trustful doctor, one writes of vitamins with considerable reservation to keep from overstepping the bornes of common sense. One can easily agree with the Food and Drugs Administration that here is a therapeutic fling that needs watchful attention to keep it within the bounds of reasonable scientific application until science, in searching the great sea of unknowns, slowly brings out the facts the doctor can use in the course of his daily work.

"Vitaminology" represents some remarkable discoveries. It has shown that certain animals can be experimentally sickened and cured at will and with mathematical precision by merely governing the intake of vitamins A, B, C, D, and E. But, what constitutes the dosage of the combined vitamins required to maintain the endocrine balance of perfect health is the unsolved conundrum that leaves the way open for immature pretenses.

Abstracts

RABIES IN TRINIDAD

From the bites of vampire bats[1] (*Desmodus rotundus*), inhabiting Trinidad, over 2000 animals died during the ten-year period, 1925 to 1935. No case of recovery has been observed. No dog or other carnivore has so far been shown to be naturally affected. The disease assumed the paralytic form in animals and in no instance did transmission from one animal to another occur by the bite of any of these 2000 animals or in any manner, naturally, other than by the bite of a vampire bat.

The experimental evidence from animal inoculation and examination for Negri bodies submitted, demonstrates that bats are infected with the virus of rabies and that Desmodus bats are the agencies by which the disease is being spread. The regular history of a bat-bite previous to the development of symptoms, and the localization of the first symptoms to the site of the bite, are conclusive in their significance. The statement that all mammals are susceptible to rabies therefore, can be received unreservedly.

* * * *

X-RAY DIAGNOSIS IN THE HORSE

Reviewing the pitfalls of x-ray diagnosis in the area of the phalanges, Jones[2] makes the following comment: Frog-cleft shadow may be mistaken for a fracture line. A fractured os pedis, or a fracture of the navicular bone may be confused with a frog-cleft shadow. Caries of the navicular bone may be mistaken for a central frog-cleft shadow and *vice versa*. The normal furred appearance of the pyramidal process of the os pedis has been diagnosed incorrectly as early pyramidal disease. The overlap of the basilar and retrossal processes may be mistaken for a pedal osteitis. The foraminated lower edge of the navicular bone may be interpreted to be an osteitis of that edge. The wing of the os pedis sometimes abuts upon the navicular bone, giving an impression of a fracture, either of that bone or of the second phalanx, or of an osteitis of that edge of the bone. In the heavy breeds, the thick hoof wall will cast a circular line shadow which will include the wings of the os pedis and the semilunar canal. The heel outline usually crosses the lower end of the first phalanx. The posterior edge of the articular surface of the os pedis gives a definite shadow line immediately under the navicular bone, and nearly corresponding in contour with its lower outline, crossing the lower end of the second phalanx. There is often, especially in aged horses, a shadow, usually symmetrical, on the second phalanx that corresponds with the insertion of the co-lateral ligaments; this must not be confused with a low ringbone. In the lateral view the line of the intermediate groove of the proximal surfaces of the phalanges might be taken for a fracture line. The super-imposition of the lateral condyles and tuberosities must not be interpreted as exostoses or ringbones.

* * * *

MINERAL DEFICIENCY IN LIVESTOCK

A condition of mineral deficiency in cattle and other livestock, termed "pine", has been known to exist in Scotland and other parts of the world for more than a century.[4] One of the most prevalent types is due to a deficiency of iron, and for 20 years it has been recognized that the administration of iron can prevent or cure it. Pine untreated results in unthriftiness, emaciation and death. Its timely treatment has proved of vast economic value to stock owners everywhere, and still greater economies will be effected when the treatment becomes more widely known. Calcium and phosphorus deficiency was recognized fully 60 years ago as causing faulty bone formation. It has been shown further that lack of lime will lead to poor coats, unhealthy offspring, interference with the detoxicat-

[1] Pawan, J. L. 1936. The transmission of Paralytic Rabies in Trinidad by the Vampire Bat. *Ann. Trop. Med. & Parasit.* 30:101-129.

[2] Jones, V. B. 1936. The Interpretation of Radiographs of the Equine Phalanges. *Vet. Jour.* 92:170-174.

[4] Dryerre, H. 1936. Mineral Deficiency Diseases in Farm Animals. *Vet Jour.* 92:163-169.

ing function of the liver, and a poor milk yield. A sufficiency of both calcium and phosphorus should be striven for rather than that they be present in any particular ratio. In lactation tetany there exists a deficiency of magnesium in the blood, sometimes accompanied by a hypocalcemia. The parenteral administration of magnesium has proved beneficial.

HANDLING MASTITIS IN DAIRIES

The question, what can we do with cows that are affected with chronic mammitis, Mayall [5] answers as follow: Isolate them if possible, and keep the milk out of regular supply. Have them milked three or four times daily and destroy the milk, or at any rate boil it before giving to pigs, calves or poultry. Use the dislac test on suspected cows, and give the farmer or dairyman some dislac cards, explaining their use to him, and telling him not to put the milk in the general supply until the test shows it to be normal. If after a fair period of time milk does not become normal the cow should be removed from the herd permanently.

AN IMPROVED RINDERPEST VIRUS

For protecting country and cross bred cattle against rinderpest,[6] goat virus may be utilized without serious risks and with the least expense. The immunity conferred does not seem to differ from that set up by the bull virus.

The mortality[7] is practically nil or negligible. Occurrence of diarrhea after a time may be due either to coccidiosis or to intestinal parasites, particularly of strongylus species. Sudden rise of temperature may be due to resuscitation of piroplasma or to some other specific disease.

[5] Mayall, G. 1936. Mammitis or Mastitis in the Bovidal. *Vet. Jour.* 92:369-370.

[6] Rahim-ud-din, M. 1936. Experiment with Bull Virus (Rinderpest) on Animals Protected with Goat Virus. *Indian Vet. Jour.* 13:48-49.

[7] Rahim-ud-din, M. 1936. Rinderpest Immunisation at Livestock Research Station Hosur Cattle Farm. *Indian Vet. Jour.* 13:128-130.

EFFECTS OF HORSE SERUM ON TUBERCULOSIS

Studying the action of fresh blood and serum of healthy horses upon tuberculous cattle, and comparing them with the action of fresh blood and serum from calves immunized against tuberculosis, Colosini [8] claims that in the blood corpuscles, as well as in the serum, there exists substances capable of neutralizing and diluting the hyperthermic reaction of esotuberculin. This phenomenon is not always complete, but it can be demonstrated in every instance.

AGE SUSCEPTIBILITY TO TUBERCULOSIS

Studying the incidence of tuberculosis[8] and its various forms among cattle, Grazzini observed that tuberculosis in calves less than four months of age is an exception rather than a curiosity. The greatest percentage of infection is found among breeding cows which succumb to the disease more easily under conditions of stabling. The type most frequently encountered is the circumscribed infection of the respiratory tract.

TREATMENT OF RINDERPEST

In cases where there are ample facilities for strict isolation of the animal and its attendant, treatment of rinderpest may be undertaken.[9] Good nursing of the patient plays a very important part in the successful treatment. It consists in allowing the animal bedding, a rug and in giving warm rice gruel twice or thrice a day. Direct exposures to cold draughts should be avoided and the animal should not be disturbed unnecessarily. No attempt should be made to stop the diarrhea with the use of strong astringents. The main effort should be directed towards maintaining the strength of the animal with liquid nourish-

[8] Colosini, P. 1936. Anti-"esotuberculina" d'origine naturale nel cavallo e nel bue. *Profilassi* 9:52-55.

[8] Grazzini, A. 1936. Contributo allo studio delle forme anatomiche e sulla frequenza della tuberculosi nei bovini. *Profilassi* 9:91-92.

[9] D'Costa, R. S. J. 1936. Rinderpest: Its Differential Diagnosis and Treatment. *Indian Vet. Jour.* 13:120-124.

ing food, and soft fodder which can be easily digested. Curative treatment being ineffective and inadvisable owing to the highly contagious nature of the disease, prevention in the form of police and protective measures would seem to be a more reasonable method of combating outbreaks and checking spread of the disease to the healthy animals of the herd and those of the neighborhood.

* * * *

IONIZING TREATMENT OF CORNMEAL ULCER

Applying ionization by different methods to diseases of the eye in dogs, Erlanger[13] studied its great therapeutic value. The very moment of using ionization, the pathological picture changed. Keratitis in distemper with a perforation and prolapse of the iris, for instance, will take the following course: The conjunctiva is suppurating; after some days the cornea is affected, becoming opaque; there is less of epithelium, an ulcer is forming, and suddenly the ulcer perforates. The iris is attached to the cornea, a certain vascularisation is evident after some time. The cornea remains cloudy, the iris is attached to the cornea in spite of the use of atropine. After anesthesia with a 2% cocaine or a 1% pantocaine solution, treatment is begun with 0.25% sulphate of zinc with some drops of adrenalin 1:1000 (1 milliampere) one to two minutes. The next day there is a change in the appearance of the eye. The vessels of the livid vascularisation are spreading in the direction of the hole in the cornea. The second treatment consists in applying calcium chloride 0.5% with drops of adrenalin to the whole cornea. Thus a change from zinc to calcium is made, but always with adrenalin. At the end of a week, another system of vascularisation has taken place; the cornea is transparent, the iris has been drawn back from the cornea, and the pupil is round again. The vascularisation consists of a few vessels only, which provide the cornea with better nutrition, for the vessels look quite red instead of the livid color of the former vascularisation. With the aid of zinc the progress of the growth of epithelium is made secure; the adrenalin exercises an irresistible traction on the iris; the frequent application of calcium sensitises the sympathetic nerve and produces an active hyperemia instead of the passive hyperemia which induces only a congestion of vessels and causes that livid ring of vascularisation. It is impressive to observe how only a few vessels are necessary for the healing of a big ulcer, so that the cornea again becomes transparent. Here is the confirmation of a real biological law: minute irritation leads to an ideal restoration of the severely damaged cornea. This restoration is even possible in spite of the continuing suppurative exudation of the conjunctiva. There is no possibility any more of infection of the cornea, so great is the effect of the method on the resistance of the tissues. All the cases were treated without any bandage.

From an experimental view, Erlanger tried to treat some cases of staphylomata of the eye, which he saw by chance. Such dogs are otherwise killed by veterinarians. It was astonishing to observe the vascularisation migrate to the top of the staphyloma. The cornea cleared up, and at the end of a week a prolapse of the iris appeared. After some ten days this disappeared and a round globe developed out of the former staphyloma. Such a therapeutic effect is really convincing, and no further skepticism is permissible.

With the above mentioned method, Erlanger could in every acute case of perforated cornea bring back the prolapsed iris into the anterior chamber, in most of the cases even with a free moving pupil. But also in old cases of iris prolapse good results were obtained. Mention is made of the case of a dachshund which had a subconjunctival prolapse of the whole of the upper part of the iris. After ten treatments the iris was completely in the anterior chamber. The cornea, which had a hunch in the upper part, became quite clear and normally curved; the irritation of the eye which had existed several months had

[13] Erlanger, G. 1936. On the Scientific and Practical Value of Ionization in Ophthalmology. Recent Advances and Researches. The *British Journal of Ophthalmology*, (April). Reprinted in *The Veterinary Journal*. 92:280-290.

ceased altogether. One year later the eye was in the same good condition.

PARASITE LESIONS RESEMBLE TUBERCULOSIS

Setaria labiato-papillosa,[10] (Alessandrini 1838) Railliet and Henry 1911, a well-known parasite of cattle, occurs in the peritoneal cavity, where it may become encysted on the peritoneal wall. The cyst resembles a tubercular lesion on superficial examination. Inquiring into the synonomy of this filarial parasite, Baylis suggests, on the basis of the evidence presented by him, and in accordance with the law of priority, that the name *Setaria labiato-papillosa* be replaced by the name *Setaria cervi* (Rudolphi 1819).

HEMOLYTIC STREPTOCOCCI IN RUMINANTS

Hemolytic streptococci are frequently found in crypts of the tonsils of cow, hog, and sheep.[11] They constitute part of the normal flora of the lymphoid tissue of the oropharynx of these animals. The streptococci conform to the animal type and differ from the human type and from the *Streptococcus epidemicus* of bovine mastitis and epidemic septic sore throat of man.

HEMOLYTIC STREP. IN DOGS

Hemolytic streptococci are constantly present in the tonsils of apparently normal dogs.[12] They occur in predominant numbers in acute tonsillitis of dogs and are secondary invaders in the bronchopneumonia of distemper. Experimentally acute tonsillitis is produced by swabbing freshly isolated canine strains on the surface of the tonsils of dogs. The streptococci from dogs conform to the animal type and differ from the human type.

[10] Baylis, H. A. 1936. On the Nomenclature and Synonomy of the Nematode Setaria Labiato-Papillosa. *Ann. Trop. Med. & Parasit.* 30:293-298.

[11] Pilot, J., Buch, C., and Davis, D. G. 1936. Hemolytic Streptococci from Tonsils of Cow, Hog, and Sheep. *Proc. Soc. Exp. Biol. and Med.* 34:233-235.

[12] Pilot, J., Buch, C., Davis, D. J., and Eastman, D. A. 1936. Tonsillitis in Dogs Due to Hemolytic Streptococci. *Proc. Soc. Exp. Biol. and Med.* 34:499-502.

TUMORS IN DOGS

Of ten blastomata [14] observed in the dog, one, a lympho-sarcoma, was found to be localised in the spermatic cord; the other nine were localised in the epididymis region of the testicle. One of the latter tumors occurred in an ectopic testicle; another one had produced metastases in the preaortic lymphglands. Microscopically, gradual transition from normal seminal cells to tumor cells could be seen. Tagliavini explains the variation in structure and behavior of these so-called seminomata on the basis of differences in development. He accepts the theory that the histiogenesis of these blastomata is to be found directly in the primordial epithelial cells of the mesothelium of the coelom. He mentions further cases of interstitiomata which he considers to be benign blastomata, caused by the activity of hormones.

BELTSVILLE EXPERIMENTS

In the Beltsville experiments, pure stands of grasses and clovers were grown on small plots of rather poor soil, and also on the same soil enriched with various combinations of nitrogen and phosphorus fertilizers. Analysis of the grasses clipped from the plots showed that on Kentucky bluegrass nitrogen applied in the fertilizer increased the crude protein in the herbage 12.34%; phosphorus applied in fertilizer increased the phosphorus in the herbage 25.64% and resulted in an increase of 16.67% in the calcium content of the herbage. Evidently an adequate supply of available phosphorus enables the plant to utilize larger quantities of calcium.

The results with white clover differed somewhat from those with Kentucky bluegrass. Nitrogen applications did not increase the percentage of protein in the clover and there was a significant decrease in calcium where nitrogen was applied. Phosphorus in the fertilizer, however, increased the phosphorus content of the clover 22.22% and the calcium content 11.9%.

[14] Tagliavini, A. 1936. Di alcuni tumori del testicolo del cane. *Profilassi* 9:134-147.

Book Reviews

Disinfection and Sterilization, by Ernest C. McCulloch. 525 pages, 53 engravings. Published by Lea and Febiger, Philadelphia, 1936. Price $5.50.

In the last analysis, the warfare against infectious diseases is a fight against pathogenic germs. In order to launch a successful campaign against microbial enemies of our domestic animals, it is necessary that one take the offensive and attack these germs wherever they can be located. It is essential, therefore, that the veterinarian or other sanitarian in charge of the protection of our livestock possesses a thorough knowledge not only of the peculiarities of the infectious germs themselves, but also of the possibilities and limitations of the weapons at his command, designed to destroy them. McCulloch's book is written to give just this information. The material he has assembled forms a monograph of the practical problems involved in disinfection and sterilization as a means of preventing infectious diseases of our domestic animals. In a clear and not too technical manner the reader is made familiar with the principles underlying proper disinfection.

The discussion is grouped into 19 chapters as follows: The development of our knowledge of disinfection and sterilization; Natural agencies which control microbial populations; The germicidal properties of the body, its fluids and secretions; The destruction of microorganisms by radiant energy examinations; The effect of temperature upon microbial life; Pasteurization; Other physical agents; How disinfectants are compared; The dynamics of disinfection; The acids; The alkalies; The heavy metals and their salts; The dyes; The phenols, cresols, alcohols, and related compounds; The halogens; Water purification; Sewage treatment; Miscellaneous disinfectants; The selection of a disinfectant.

In the foreword to this book H. B. Ward says: "One cannot easily overrate the high value of the work of those who seek to give wider currency to methods of control and the spheres of their proper application. Doctor McCulloch has devoted this volume to a presentation of this aspect of the subject. An important study in formal education, it has also real significance for those outside of institutional circles who are interested in orienting themselves on any old or new questions in the field of bacterial control whether they arise in private or public relations. To those who are thinking along such lines this work will appeal." In the daily routine work of the veterinary practitioner there arise many vexing technical problems which should be decided according to the latest scientific information on the subject. Such problems as "the disinfecting value of soaps," "the disinfecting properties of ointments," "the power of intestinal antiseptics," "the disinfection of surgical catgut sutures," the sterilization of ampules,," "the factors to be considered in selecting a disinfectant," all these and many, many other interesting topics find a ready answer in the pages of this book. McCulloch is not unknown to the readers of Veterinary Medicine, having contributed to it several valuable papers during the past year (Vol. No. 31, Pp. 190, 386, 487), and in preceding years. The wide experience of the author in this field gives assurance that this reference work will not be consulted in vain, whatever the information sought concerning disinfection may be. The importance of the subject dealt with makes this treatise a welcome and valuable addition to the practitioner's library.

Legal Aspects of Christian Science. By I. H. Rubenstein. 33 pages. Published by the Crandon Press, Chicago. 1935.

Christian Science is a philosophical system conflicting with that of the Medical Sciences. If the veterinary practitioner should ever clash with this religious belief on legal grounds, this pamphlet may give him a certain orientation, although it does not contain any precedents directly applicable to veterinary conditions. The more pertinent paragraphs, briefly discussed in this booklet, are Negligence in failing to obtain prompt medical care; Civil actions by practitioners; Civil actions against prac-

titioners; Criminal aspects of Christian Science; Christian Science and Public Health.

Clinical Diagnostics of the Internal Diseases of Domestic Animals by Dr. B. Malkmus, Former Professor of Pathology and Director of the Veterinary College at Hanover, Germany. Eleventh Edition. Revised by Dr. Th. Oppermann, Professor of Pathology and Director of the Medical Clinic of the Veterinary College at Hanover, Germany. Revised from the Latest English Translation and Eleventh German Edition by John R. Mohler, A.M., V.M.D., D.Sc. Chief, United States Bureau of Animal Industry, and Adolph Eichhorn, D.V.S. Director, Veterinary Department, Lederle Laboratories, Inc.. Formerly Chief, Pathological Division, United States Bureau of Animal Industry. 312 pages, 71 Illustrations in the Text and One Colored Plate. Published by Alexander Eger, Chicago. 1936. Price $3.50.

The German edition of "Clinical Diagnostics" was reviewed in the August, 1933, issue of VETERINARY MEDICINE. What was then said of the original edition applies to the translation also. The book describes concisely the art of identifying animal diseases. In addition to the revisions of individual chapters, the book differs from former editions principally in that a chapter on blood diagnosis has been included in the text. The chapter gives the technique for examining the color of the blood, the coagulability, the specific gravity, the hemoglobin content, the serum, the sedimentation rate, the behavior of the blood drop upon specially prepared filter paper; the determination of blood groups, the microscopical examination of the blood, the number of blood corpuscles, the normal average of erythrocytes, the pathology of erythrocytes, the biological function of erythrocytes, the pathology of leucocytes, the biological function of leucocytes, the blood platelets and blood dust, the stimulation of the hemopoietic system, and the diseases of the blood. The book will be found not only useful and helpful to the student, but also stimulating to the veterinary practitioner, providing him with a compact and satisfactory summary of the present knowledge of diagnostic methods. The language is clear, which simplifies the use of the book. Incidentally, the work of the translators is a masterful accomplishment. The reception and popularity of this new American edition should keep in pace with the success of former editions.

The Internal Parasites and Parasitic Diseases of Sheep, Their Treatment and Control by I. Clunies Ross, D.V.Sc. Chief Parasitologist and Officer-in-Charge, F. D. McMaster, Animal Health Laboratory, Council for Scientific and Industrial Research, University of Sidney; Lecturer in Veterinary Parasitology in the University of Sidney and H. McL. Gordon, B.V.Sc. Research Officer, F. D. McMaster, Animal Health Laboratory, Council for Scientific and Industrial Research, University of Sidney; Demonstrator in Veterinary Parasitology in the University of Sidney. 238 pages, 46 plates. Published by Angus and Robertson Limited. Sydney, Australia. 1936. Price $6.25.

The manner of presentation of material contained in this book, the authors explain, is designed to assist both the scientist and the layman to find conveniently those aspects of a given problem which are of special interest to them. To this end the macroscopic and microscopic characteristics of a group or of individual parasites, which are of purely scientific interest, are first described. This is followed in the case of those parasites of major economic importance by a separate section containing a detailed description of their life-histories and methods of treatment and control. Of necessity problems of treatment and control are considered primarily from an Australian standpoint. Stress has been laid on the influence of climate and rainfall in the occurrence of the more important parasites in Australia, and as far as they are known, their distributions have been mapped.

The book is divided into three sections. Section 1 deals with the flukes and tapeworms, alloting 66 pages to it. Section 2 describes the roundworms, devoting 119 pages to it. Section 3, containing 23 pages, gives direction for the collection and preservation of parasites, and methods of diagnosis in the living animal. An appendix of three pages gives information on the relationship of parasites of rabbits and of kangaroos to parasitic infection in sheep. A

glossary of scientific terms occupies another three pages. The bibliography is listed on five pages. The index comprises about seven pages. Unfortunately the diction is not pleasing and often neither clear nor concise. Awkwardly constructed sentences detract something from value of scientific statements.

To reiterate, the purpose of this book is a purely practical and didactic one. The subject is presented accordingly. The book forms, therefore, an indispensable reference work on sheep parasites. It will prove of value to sheep practitioners in the United States. The experience and competency of the authors in the field of ovine parasitology assures the reader of an authoritative discussion, an expectation which will not be disappointed.

Practical Veterinary Pharmacology, Materia Medica and Therapeutics. By Howard Jay Milks, Professor of Therapeutics and Director of the Small Animal Clinic, New York State Veterinary College at Cornell University, Ithaca, N. Y., with a chapter on Biological Therapeutics by Adolph Eichhorn, director, Veterinary Department, Lederle Laboratories, New York, N. Y. 581 pages, 33 illustrations, cloth bound. Alexander Eger, Chicago, 1936. $6.00.

This book, which in its previous two editions has been the standard reference work on veterinary pharmacology, materia medica and therapeutics for nearly twenty years, needs no introduction to the profession. Primarily a textbook for use in veterinary colleges, it appeals also to the progressive veterinary practitioner who, of necessity must always remain a student and, therefore, will welcome this opportunity to widen his background for his daily practice.

The present edition of the text conforms with the eleventh edition of the United States Pharmacopea. Those drugs and compounds of the sixth edition of the National Formulary which are of interest to the veterinarian have also been included in the list of preparations. This revision and other additions to the text amply justify the practitioner in discarding the older edition and procuring a copy of the new third edition at once. After all the *raison d' être* for medicine is the treatment of the sick—therapeutics and if the practitioner neglects progress in pharmacology and therapeutics has he a "reason for being?" Written by an experienced teacher, this book can be recommended not only without reserve, but with real enthusiasm.

The Incidence and Pathology of Tumors of Domesticated Animals in South Africa. By Cecil Jackson, B.Sc., B.V.Sc. 460 pages; 187 figures. Published by the Government Printer, Pretoria, Union of South Africa. 1936. Price $1.25.

Number one of volume six of "The Onderstepoort (quarterly) Journal of Veterinary Science and Animal Industry" is published as a monograph on the Onderstepoort collection of neoplasms with special reference to their histopathology.

In chapter one the author considers the problems of classification and diagnosis, the difficulties in the assessment of malignancy and other difficulties, and finally the technique employed. Chapters II to IV discuss the tumors derived from squamous epithelium. Chapter V discusses the thymomas; chapter VI the mesotheliomas; chapter VII the connective tissue tumors; chapter VIII the tumors of endothelium; chapter IX contains short notes on glioma and tumors of melanin pigmented cells. Chapter X describes the mixed neoplasms. Chapter XI discusses the contagious venereal tumors, and the heart base tumors of the dog. The monograph concludes with a summary giving data on the frequency of tumors in different species of domestic animals in South Africa. Other features are: a list of references (10 pp.), three appendices giving species incidence of tumors in South Africa, organ incidence of primary tumors, and a catalog of the Onderstepoort collection of neoplasms. The index comprises 17 pages.

Du Toit, in his foreword, expresses the opinion that this striking contribution to our knowledge of new growths will prove of lasting value, not only to veterinary science, but also to human pathology.

Tratado des Doencas Das Aves (Diseases of Birds) by J. Reis and P. Nobrega with the collaboration of A. S. Reis. Published by the Instituto Biologico, Sao Paulo, Brazil, 1936.

Due to rapid strides of veterinary research in avian pathology, textbooks on diseases of domestic birds soon become obsolete unless they are revised from time to time. The United States has contributed perhaps more than any other country to the sum total of the knowledge on poultry diseases; yet, the more recent treatises (British as well as American) on this subject are written primarily for the layman. It is, therefore, a keen delight to open a book, though the language is Portuguese, that is written really for the veterinary poultry practitioner. The subject matter is grouped into eight parts: Virus diseases; fungus diseases; protozoal diseases; helminth diseases; arthropod parasites, nutritional diseases, and organic diseases. To those veterinarians who are fortunate enough to read Portuguese, this monograph offers a rich mine of up-to-the-minute information on the diseases of poultry, their treatment and prevention. A special feature of the book is that the synonyms of the names of the diseases are given in other foreign languages; the index also contains these synonyms (including the English), so that any veterinarian with even a smattering knowledge of Portuguese will be able to make intelligent use of this scholarly reference work.

Over Een, Naar Aanleiding Van Likzucht, Ingesteld Morphologisch Bloedonderzoek Bij Het Gezonde En Het Zieke Rund (Morphological blood studies of cattle in health and disease) by Dr. J. W. Thijn. 155 pages, 2 plates, 8 figures, and over 40 tables. Published by Van Gorcum, Assen, Holland. Price f 3.90 ($2.15).

This monograph appears at an opportune time when there is awakened interest in the study of hematology of domestic animals. The discussion of the subject is divided into eleven chapters as follows: Introduction, technic of examination, the normal erythrocyte count in cattle, the size of the erythrocytes in cattle, the leucocyte count in cattle, morphological changes in the blood picture of sick cattle, blood studies in actual cattle practice, the leucocyte picture in four calves during the first week following birth, piroplasmosis, chronic pica and bibliography.

The information is presented in a form useful to the cattle practitioner. It is a valuable reference volume and should be accessible in the libraries of our veterinary colleges and experiment stations. This is the first volume of a new series of veterinary monographs to be published by Van Gorcum.

John Stratton Koen, Chicago, B.A.I.; John Leonard Axby, Indianapolis, State Veterinarian Charles E. Salsbery, Kansas City, Jensen-Salsbery Laboratories and L. J. Allen, Oklahoma City, B.A.I. All were in attendance at the 40th Annual Meeting of the U. S. L. S. S. A.